WARNING

HIGH VOLTAGE is used in the operation of the receiver-transmitters, RT-524/VRC and RT-246/VRC, of a wheeled vehicle. DEATH ON CONTACT can result so observe the following safety precautions.

DO NOT operate a receiver-transmitter (RT) with its top and/or bottom panels removed.

DO NOT touch or stand within 20 inches (0.5 meters) of an RT's antenna when there is a possibility that the RT could be keyed and transmitting.

If at all possible, work on the equipment only when another person is nearby who is competent in CARDIOPULMONARY RESUSCITATION (CPR) and the five safety steps of the inside cover.

DO NOT BE MISLED by the terms "low voltage" and "low potential." Voltages/potentials as low as 50 volts can cause DEATH under certain conditions.

Remove or tape all exposed personal metal objects (e.g., watches, rings, and medallions) before working on C-E equipment.

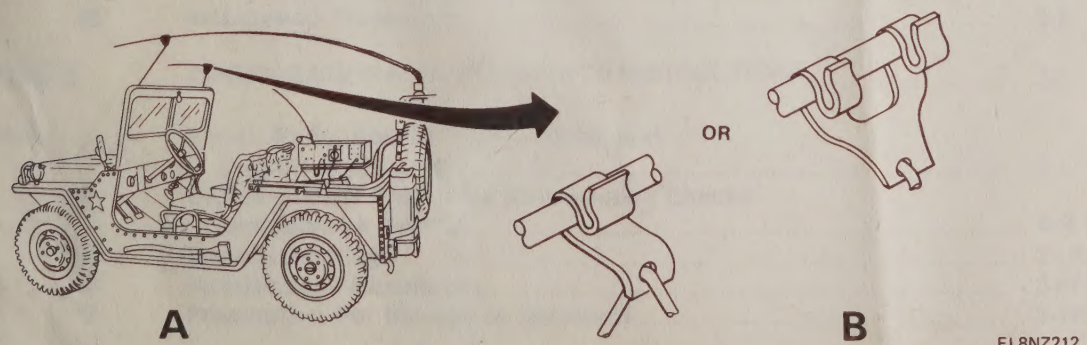
WARNING

HIGH VOLTAGE can be encountered when a communication antenna of a vehicle strikes a powerline. DEATH TO PERSONS inside, or in contact with, the vehicle can result. To reduce this hazard:

DO NOT stop or park a vehicle under any type of powerline.

If you are not sure that an antenna will clear a powerline, stop the vehicle before getting close to the powerline and then either remove an antenna element or carefully tie down the antenna elements to insure that the vehicle can be safely driven under the powerline.

Vehicles with antennas that have two or more antenna elements (auxiliary receiver antennas and/or RT antennas AT-912/VRC and AS-1729/VRC) will probably strike railroad and/or streetcar power (trolley) lines unless the antenna elements are correctly tied down as in (A) below. To reduce the risk of an antenna element coming loose from its tiedown clamp, the clamp must be secured to the upper antenna element as in (B) below.



If possible, try to maintain communications with the vehicle antennas tied down.

WARNING

DEATH or SERIOUS INJURIES can result:

When antenna tip caps (para 2-9) are NOT installed on the upper element of antennas that are to be tied down.

When a tied down antenna strikes a fixed object such as an overhead bridge, tree limb, and so forth. Outside persons may be struck by flying antenna parts.

WARNING

DEATH or SERIOUS INJURY can result from the improper use of solvent TRICHLOROTRIFLUOROETHANE. Fumes from this solvent are toxic (poisonous) and prolonged breathing of vapors must be avoided. This solvent will dissolve natural skin oils; therefore, prolonged contact with skin must be avoided. Use TRICHLOROTRIFLUOROETHANE only when:

Adequate ventilation is provided.

Protective goggles, gloves, sleeves, and an apron are worn.

Do NOT use compressed air to dry parts.

If solvent is taken internally, CONSULT A PHYSICIAN IMMEDIATELY.

WARNING

SERIOUS INJURY can result from lifting too heavy an object. As a general rule, DO NOT attempt to lift alone an object that exceeds one-third (1/3) of your body weight. An object of such weight is considered a TWO-PERSON LIFT item. An RT-524 and RT-246 each weigh a little more than 60 pounds.

CAUTION

Throughout this manual, there are CAUTIONS that must be observed when doing specific procedures to avoid possible damage to the equipment. Read each caution carefully and then adhere to appropriate safety procedures when doing the work.

TECHNICAL MANUAL
NO. 11-5820-401-20-1
EE150-JA-MMO-010/E154 VRC 12, 43

HEADQUARTERS
DEPARTMENTS OF THE ARMY AND NAVY
Washington, DC, 3 January 1984

Organizational Technical Manual

RADIO SETS: AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (NSN 5820-00-223-7415), AN/VRC-44 (NSN 5820-00-223-7417), AN/VRC-45 (NSN 5820-00-223-7418), AN/VRC-46 (NSN 5820-00-223-7433), AN/VRC-47 (NSN 5820-00-223-7434), AN/VRC-48 (NSN 5820-00-223-7435), AN/VRC-49 (NSN 5820-00-223-7437)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. For Navy, mail comments to the Commander, Naval Electronics Systems Command, ATTN: ELEX 8122, Washington, DC 20360. A reply will be furnished direct to you.

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Section	I	General Information	1-1
	II	**Equipment Description and Data**	**1-4**
	III	**Principles of Operation**	**1-32**
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	II	Service Upon Receipt	2-2
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	III	**Troubleshooting**	**3-13**
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*This manual, together with TM 11-5820-401-20-2, -10-1, and -10-2, supersedes TM 11-5820-401-12 including all changes.

			Page
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	C	Expendable Supplies and Materials	C-1
GLOSSARY			Glossary
INDEX			Index 1
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HOW TO USE THIS MANUAL

This manual is designed to help you do organizational maintenance for any one of the eight AN/VRC-12 series radio sets installed in wheeled vehicles.

The front cover index is provided for quick reference to important information by general listings. The index on the final pages will help locate specific information by alphabetical listing.

Measurements in the manual are given in both English and Metric Units.

Read all preliminary information found at the beginning of each procedure. It has important information and safety instructions you must follow before beginning work.

Warning pages are at the beginning of this manual. You should learn the warnings before doing maintenance on the equipment and always follow appropriate safety procedures and precautions.

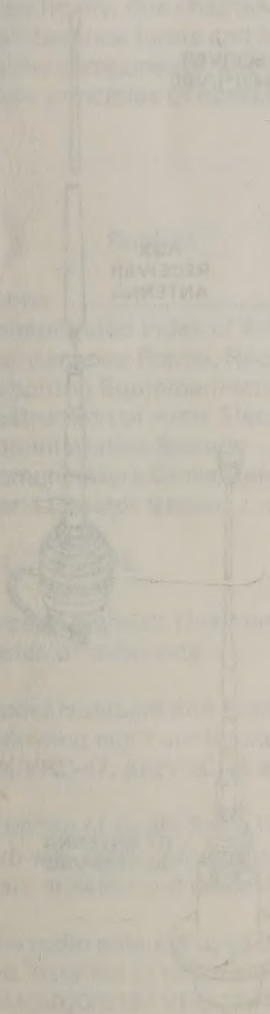
Paragraphs in this manual are numbered by chapter and order of appearance within a chapter. A subject index appears at the beginning of each chapter section to help you find the exact paragraph you are looking for.

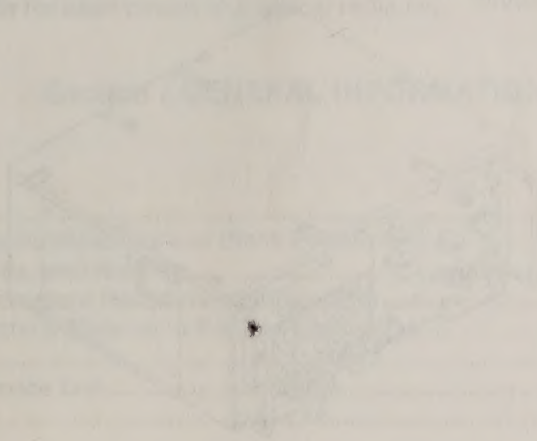
Instructions for using troubleshooting tables are located in paragraph 3-7.

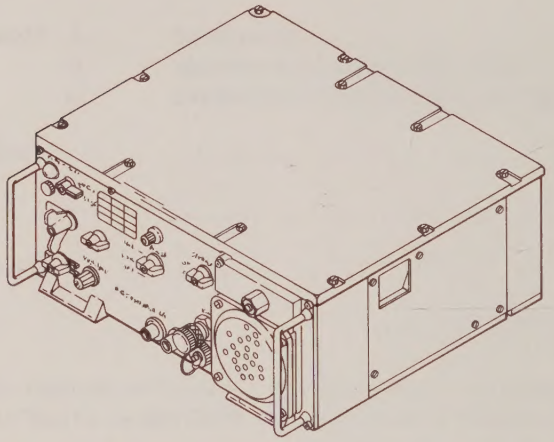
Instructions for performing the PMCS are located in paragraph 3-4.

Instructions for installing items of equipment are located in paragraph 2-4.

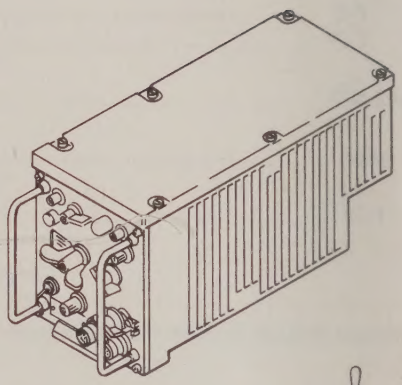
Instructions for evaluating the performance of the equipment are located in paragraph 3-13.



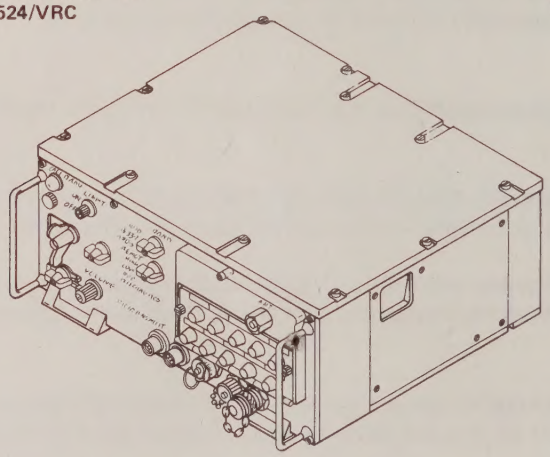




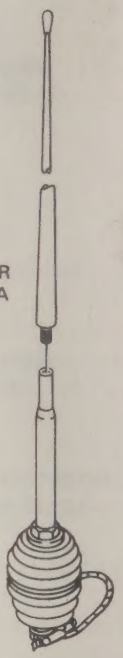
RECEIVER-TRANSMITTER
RT-524/VRC



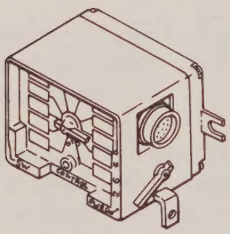
RECEIVER
R-442(*)/VRC



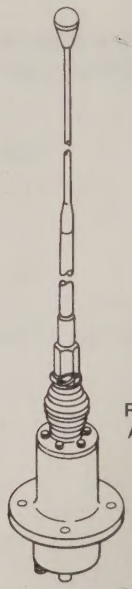
RECEIVER-TRANSMITTER
RT-246/VRC



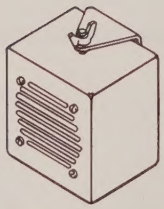
AUX
RECEIVER
ANTENNA



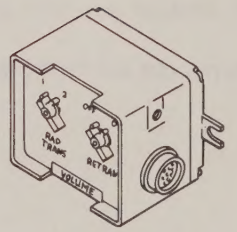
CONTROL BOX
C-2742/VRC



RT ANTENNA
AS-1729/VRC



LOUDSPEAKER
LS-454/U



CONTROL BOX
C-2299/VRC

EL8NZ001

CHAPTER 1

INTRODUCTION

Subject	Section	Page
General Information	I	1-1
Equipment Description and Data	II	1-4
Principles of Operation	III	1-32

OVERVIEW

This chapter provides general information about the communication-electronics (C-E) items of equipment that make up the AN/VRC-12 series of radio sets installed in wheeled vehicles. Specifically, this chapter covers the names and model numbers of the C-E components, common maintenance forms and records associated with the components, general administrative procedures for the components, and specific descriptions and data about each component. It also presents the basic principles of operation for each circuit of a typical radio set.

Section I GENERAL INFORMATION

Subject	Para	Page
Scope	1-1	1-1
Consolidated Index of Army Publications and Blank Forms	1-2	1-2
Maintenance Forms, Records, and Reports	1-3	1-2
Reporting Equipment Improvement Recommendations (EIR)	1-4	1-2
Destruction of Army Electronics Materiel to Prevent Enemy Use	1-5	1-2
Administrative Storage	1-6	1-2
Nomenclature Cross-Reference List	1-7	1-3
Hand Receipt Manual	1-8	1-4

1-1. SCOPE.

Type of Manual: This manual covers the organizational level of maintenance for the AN/VRC-12 series of radio sets.

Model Numbers and Equipment Names: The AN/VRC-12 series of radio sets consists of the following eight configurations: AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48 and AN/VRC-49.

Purpose of Radio Sets: The purpose of the AN/VRC-12 series of radio sets is to provide short range, two-way radio communication in the 30- to 75.95-MHz range, using frequency-modulated (FM) transmission and reception.

The radio sets are used in vehicles such as jeeps, trucks and other wheeled vehicles. When the radios are installed in tanks and armored personnel carriers, refer to TM 11-5820-401-20-2/EE150-JA-MMO-020/E154 VRC 12, 43.

This radio set series provides for command and control of the vehicle over the two-way radio link.

1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

1-3. MAINTENANCE FORMS, RECORDS, AND REPORTS.

REPORTS OF MAINTENANCE AND EQUIPMENT STATUS (TAMMS)

Department of the Army forms and procedures used for equipment maintenance and status will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3 and unsatisfactory material/conditions (UR submissions) IAW OPNAVINST 4790.2, Vol 2, chapter 17.

REPORT OF PACKAGING AND HANDLING DEFICIENCIES

Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed by AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

DISCREPANCY IN SHIPMENT REPORT (DISREP) (SF 361)

Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/ NAVSUPINST 4610.33 C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your AN/VRC-12 series of radio sets needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on SF 368 (Quality Deficiency Report). Mail it to user: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey, 07703. We'll send you a reply.

Navy personnel are encouraged to submit EIR through their local Beneficial Suggestion Program.

1-5. DESTRUCTION OF ARMY ELECTRONICS MATERIEL TO PREVENT ENEMY USE.

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. ADMINISTRATIVE STORAGE.

Administrative storage of equipment shall be done in accordance with TM 740-90-1, Administrative Storage of Equipment. Disassembly and repacking of equipment for shipment or limited storage are covered in paragraphs 3-23 through 3-26.

1-7. NOMENCLATURE CROSS-REFERENCE LIST.

This list contains common names used throughout this manual in place of official nomenclature.

NOTE

All equipment identified with (*) represents all models of the equipment.

Common Name	Official Nomenclature
antenna, RT	Antenna AS-1729/VRC or Antenna AT-912/VRC (entire assemblies including antenna elements, bases, and mounts)
antenna, matching unit	Antenna Base, Matching Unit, MX-6707/VRC (part of Antenna AS-1729/VRC) or Antenna Matching Unit MX-2799/VRC (part of Antenna AT-912/VRC)
AN/VRC-12 series of radio sets	AN/VRC-12, AN/VRC-43, AN/VRC-44, AN/VRC-45, AN/VRC-46, AN/VRC-47, AN/VRC-48 and AN/VRC-49
aux receiver	Receiver, Radio R-442 (*)/VRC
aux receiver mounting	Mounting MT-1898/VRC
aux receiver antenna	Antenna Base AB-15/GR or AB-558/GR and Antenna Elements MS-116A, MS-117A and MS-118A
handset	Handset H-189/GR or H-250/U (earphone, microphone and key switch)
headset	Headset H-140A/U or H-251/U (earphones only)
loudspeaker	Loudspeaker LS-454/U
microphone	Microphone Dynamic M-80/U (microphone with key switch only)
radio relay box or retransmit box	Control, Radio Set C-2299/VRC
receiver-transmitter or RT	Receiver-Transmitter RT-246 (*)/VRC and RT-524 (*)/VRC
remote box	Control, Frequency Selector C-2742/VRC (used with RT-246/VRC)
RT mounting	Mounting MT-1029/VRC
switch box	Switch Box Assembly

1-8. HAND RECEIPT MANUAL.

This manual has a companion document with a TM number followed by "-HR" (Hand Receipt). The TM 11-5820-401-20-1-HR provides a listing on a preprinted DA Form 2062 (Hand Receipt) of Accountable End Items/Components of End Items (COEI) and Additional Authorization List (AAL) items related to the AN/VRC-12 series radio sets used in wheeled vehicles. There is a preprinted hand receipt for each radio set authorized for each type of wheeled vehicle. Each preprinted hand receipt lists the items of equipment authorized for installation, each item's National Stock Number (NSN) and the number (quantity) of any one item authorized for standard configurations. As an aid to property accountability, additional -HR manuals may be requisitioned from the US Army Adjutant General Publications Center, Baltimore, MD, in accordance with the procedures in Chapter 3, AR 310-2, and DA Pam 310-10-2.

Radio set items consist of the receiver-transmitter(s) (RT's) and the antenna(s), plus the aux receiver as appropriate to the AN/VRC-12 series radio set to be used with a particular vehicle.

Installation kit items consist of the receiver-transmitter mounting(s), the aux receiver mounting(s) and the radio control boxes, C-2299/VRC and C-2742/VRC, to be used with a particular vehicle and configuration. The kit also consists of headsets, handsets, microphones, loudspeakers and other items, as appropriate to a particular vehicle.

Section II EQUIPMENT DESCRIPTION AND DATA

Subject	Para	Page
Purpose and Use of Equipment	1-9	1-4
Equipment Data	1-10	1-5
Description of Components	1-11	1-11
Location of Major Components and Cabling		
M882 (Radio Sets AN/VRC-46, (-12, -47))	1-12	1-26
M151 (Radio Sets AN/VRC-12, -43 through -49)	1-13	1-27
Differences Between Models	1-14	1-28
Safety, Care and Handling	1-15	1-31

1-9. PURPOSE AND USE OF EQUIPMENT.

The eight configurations of an AN/VRC-12 series of radio sets consist of various combinations of two basic components: a FM receiver-transmitter (RT-246/VRC or RT-524/VRC) and a FM auxiliary receiver (R-442/VRC). In addition, the configurations consisting of a RT-246/VRC may have a Remote Box C-2742/VRC attached and a RT of any configuration may have a Retrans Box C-2299/VRC attached.

Various types of antennas are available, depending on the mission and the communication range needed. Normally, for wheeled vehicles, an AT-912/VRC or AS-1729/VRC is used with each RT. The Antenna Base AB-15/GR, with associated antenna elements, is used with one or more auxiliary receivers.

The vehicle's electrical system provides the 22 to 30 vdc input operating voltage for any of the radio set configurations. The vehicle's electrical system consists of a battery pack and a charging system.

Secure communication is possible using Vinson or Nestor security equipment and the X-mode facility of the radio components.

For further information on operating instructions, refer to TM 11-5820-401-10-1.

1-10. EQUIPMENT DATA.

The following table lists the operational characteristics of the radio sets.

RECEIVER-TRANSMITTERS (RT-246(*)/VRC AND RT-524(*)/VRC)

General	
Type of receiver-transmitter	FM
Frequency range	30 to 75.95 MHz at 0.05-MHz intervals
Frequency stability	± 3 kHz of selected frequency
Number of channels available	920
Type of tuning	Manual tuning exists for both RT-524(*)/VRC and RT-246(*)/VRC. For RT-246(*)/VRC, only ten frequencies can be preset for automatic pushbutton tuning; can also be selected automatically from a C-2742/VRC connected to RT-246/VRC.
Antenna jack impedance (rf)	50 ohms; BNC jack
RT antenna matching unit control	The RT provides control voltages to its antenna matching unit for proper tuning of the antenna elements. (Matching networks in Antenna AS-1729/VRC also can be manually selected.)
Operating conditions	Push-to-talk (transmit) and release-to-listen (receive)
Modes of operation	Voice (radio-telephone) and with additional equipment, retransmission (radio relay) and X-mode (speech-secured).
X-mode of operation	Provides for secure voice communication.
Audio response capability	300 to 3000 Hz
Operating voltage requirement	22 to 30 vdc
Transmitting Features	
Output rf power (into ideal 50-ohm antenna):	
Low power	0.5 to 10 watts
High power	35 watts minimum to 65 watts maximum

1-10. EQUIPMENT DATA. (CONT)

RECEIVER-TRANSMITTERS (RT-246(*)/VRC AND RT-524(*)/VRC) (CONT)

Transmitting Features (Cont)

Transmission distance (using whip antenna)	Approximately 5 miles (8 km) on low power, approximately 25 miles (40 km) on high power
Carrier deviation	Audio input of 2.8 millivolts produces rf carrier deviation of 8 kHz ± 2 kHz.
Squelch tone signal	150 Hz ± 1Hz; transmitted on all settings of SQUELCH switch except OLD ON position
Audio input impedance	150-ohm microphone; 600 ohms for X-mode operations at X-mode jack
Duty cycle	Capable of operating continuously at high power in 120°F (49°C) temperature with input operating voltage 22 vdc and for one hour with input voltage of 30 vdc

Power Drain:

Low power	3 amps at 25 vdc
High power	10 amps at 25 vdc

Receiving Features

RF signal sensitivity	0.1 microvolt, minimum
Audio output impedances (nominal):	
X-mode	600 ohms
External loudspeaker	160 ohms
Headphone	150 ohms
To RETRANS box (fixed level monitoring)	1800 ohms
Squelch types:	
Tone (operative in NEW SQUELCH)	Responsive to 150-Hz squelch tone of received signal
Carrier (operative in OLD SQUELCH)	Responsive to carrier signal

1-10. EQUIPMENT DATA. (CONT)

AUX RECEIVER R-442/VRC

General

Type of receiver	FM
Frequency range	30 to 75.95 MHz at 0.05-MHz intervals
Frequency stability	± 3 kHz of selected frequency
Number of channels available	920
Type of tuning	Manual tuning (only)
Antenna jack impedance (rf)	50 ohms; BNC jack
Operating conditions	Receive only
Modes of operation	Voice (radio receive only) and, with additional equipment, X-mode (speech-secured)
Audio response capability	300 to 3000 Hz
Operating voltage requirement	22 to 30 vdc

Receiving Features

RF signal sensitivity	0.1 microvolt minimum
Audio output impedances (nominal):	
External loudspeaker	160 ohms
Headphone	150 ohms
X-mode	600 ohms
Fixed level monitoring	1800 ohms
Squelch types:	
Carrier (operative in OLD SQUELCH)	Responsive to carrier signal
Tone (operative in NEW SQUELCH)	Responsive to 150-Hz squelch tone signal of received signal

1-10. EQUIPMENT DATA. (CONT)

RT ANTENNAS

AS-1729/VRC (ROUND BASE)

Antenna type	Two-section whip, consisting of Matching Unit MX-6707/VRC and Antenna Elements AS-1730/VRC (lower) and AT-1095/VRC (upper)
Frequency range	30 to 76 MHz
Power handling capability	70 w, maximum
Input impedance (rf)	50 ohms, BNC jack

AT-912/VRC (SQUARE BASE)

Antenna type	Two-section whip, consisting of Matching Unit MX-2799/VRC and Antenna Elements AT-1096/VRC (lower) and AT-1095/VRC (upper)
Frequency range	30 to 76 MHz
Power handling capability	70 w maximum
Input impedance (rf)	50 ohms, BNC jack

AUXILIARY RECEIVER ANTENNAS

Antenna type	Three-section whip, consisting of Antenna Base AB-15/GR or AB-558/GR and Antenna Elements MS-116 (lower), MS-117 (middle) and MS-118 (upper)
Frequency range	30 to 76 MHz

REMOTE BOX

Control frequency selector C-2742/VRC	Used with RT-246/VRC only.
Radio function	Used to remotely select any one of the ten RT-246 preset frequencies. Also provides remote control of the input operating voltage and transmit rf power level of the RT-246/VRC.

1-10. EQUIPMENT DATA. (CONT)

RADIO RELAY BOX	
Control, radio set C-2299/VRC	
Frequency range (audio)	500 to 3000 Hz
Radio function	Provides radio relay operations for the AN/VRC-45 and AN/VRC-49 configurations. Is also used to extend the RT audio accessory functions for the other six AN/VRC-12 series configurations.
AUDIO ACCESSORIES (several available)	
Push-to-talk/release-to-listen	Key switch, spring held at release-to-listen
Microphone impedance	150 ohms ± 15 percent
Earphone and loudspeaker impedance	600 ohms ± 20 percent

The following table lists the weights and dimensions of the AN/VRC-12 series radio sets.

RECEIVER-TRANSMITTERS (RT)	
RT-524/VRC	6 3/4 inches (17.15 cm) high, 13 3/8 inches (33.97 cm) deep, 15 3/8 inches (39.05 cm) wide, 51 pounds (23.15 kg)
RT-246/VRC	6 3/4 inches (17.15 cm) high, 13 3/8 inches (33.97 cm) deep, 15 3/8 inches (39.05 cm) wide, 51 pounds (23.15 kg)
AUX RECEIVER	
R-442(*)/VRC	6 3/4 inches (17.15 cm) high, 13 3/8 inches (33.97 cm) deep, 5 5/8 inches (14.29 cm) wide, 18 1/4 pounds (8.29 kg)
ANTENNAS	
AS-1729/VRC (assembled)	10 1/2 feet (3.20 meter) long, 10 pounds (4.54 kg)
Element AS-1730/VRC	4 feet, 4 3/8 inches (1.33 m) long
Element AT-1095/VRC	5 feet, 4 1/2 inches (1.64 m) long
Antenna Matching Unit MX-6707/VRC	14 3/8 inches (36.51 cm) long

1-10. EQUIPMENT DATA. (CONT)

ANTENNAS (CONT)

AT-912/VRC (assembled)	Vertical: 11 1/4 feet (3.43 m) long; horizontal: 10 1/2 feet (3.20 m) long; 18 pounds (8.17 kg)
Antenna Base AB-719/VRC	9 1/2 inches (24.13 cm) long.
Element AT-1095/VRC	5 feet, 4 1/2 inches (1.64 m) long
Element AT-1096/VRC	4 feet, 6 inches (1.37 m) long
Antenna Matching Unit MX-2799/VRC	4 inches (10.16 cm) high, 5 1/4 inches (13.34 cm) deep, 12 1/2 inches (31.75 cm) wide, 10 pounds (4.54 kg)

AUX RECEIVER ANTENNA

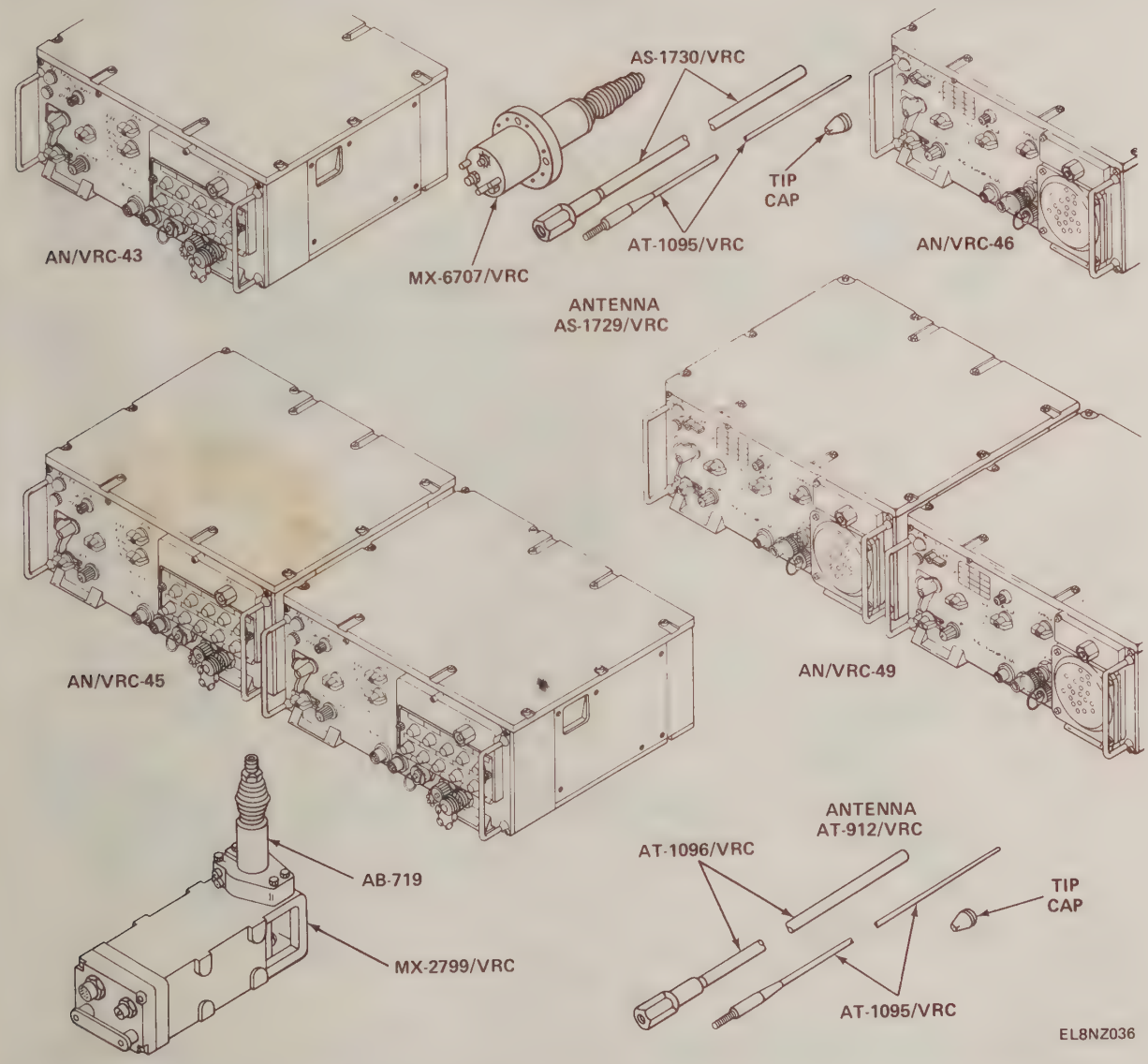
Assembled	33 1/2 inches (85.09 cm) long
Antenna Base AB-15/GR and AB-558/GR	17 1/2 inches (44.45 cm) long
Element MS-116A	3 feet, 3 1/2 inches (1.00 m) long
Element MS-117A	3 feet, 3 1/2 inches (1.00 m) long
Element MS-118A	3 feet, 3 3/4 inches (1.01 m) long
Mounting MT-1029/VRC	5 inches (12.70 cm) high, 13 1/2 inches (34.29 cm) deep, 15 7/8 inches (40.32 cm) wide, 17 1/2 pounds (7.95 kg)
Mounting MT-1898/VRC	5 inches (12.70 cm) high, 13 1/2 inches (34.29 cm) deep, 5 1/2 inches (13.97 cm) wide, 9 1/4 pounds (4.20 kg).

REMOTE BOXES

Control, radio set C-2299/VRC	3 3/8 inches (8.57 cm) high, 3 3/8 inches (8.57 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 pounds (0.91 kg)
Control, frequency selector C-2742/VRC	3 3/16 inches (8.10 cm) high, 3 1/4 inches (8.26 cm) deep, 4 3/8 inches (11.11 cm) wide, 2 pounds (0.91 kg)

1-11. DESCRIPTION OF COMPONENTS.

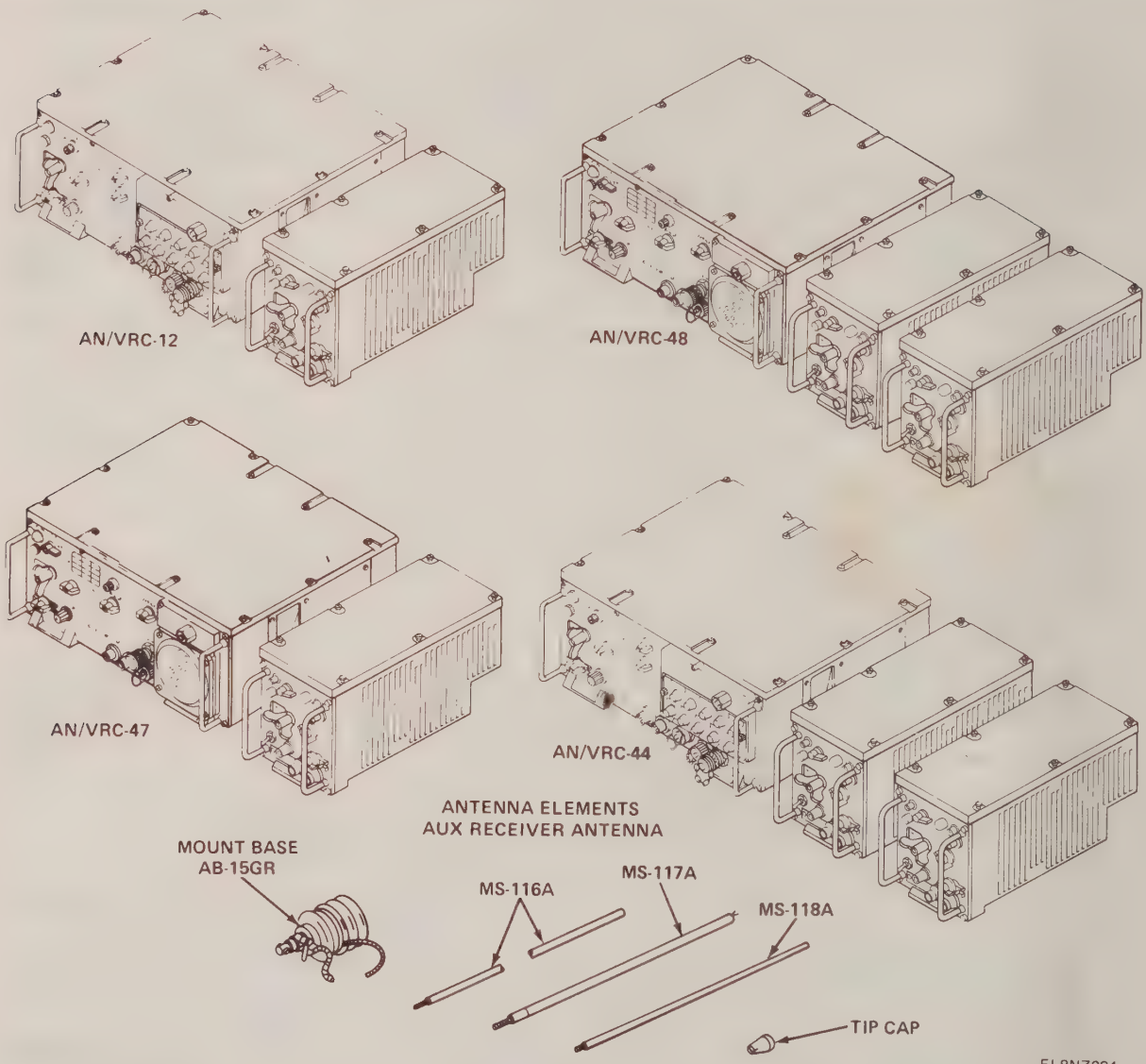
RADIO SET COMPONENTS: AN/VRC-12 SERIES



The FM medium-power radio sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49 are commonly referred to as the AN/VRC-12 series radios. All eight configurations of these radio sets consist of at least one RT, an FM receiver-transmitter (RT-246/VRC or RT-524/VRC), and six of the configurations include an auxiliary FM receiver (R-442/VRC).

1-11. DESCRIPTION OF COMPONENTS. (CONT)

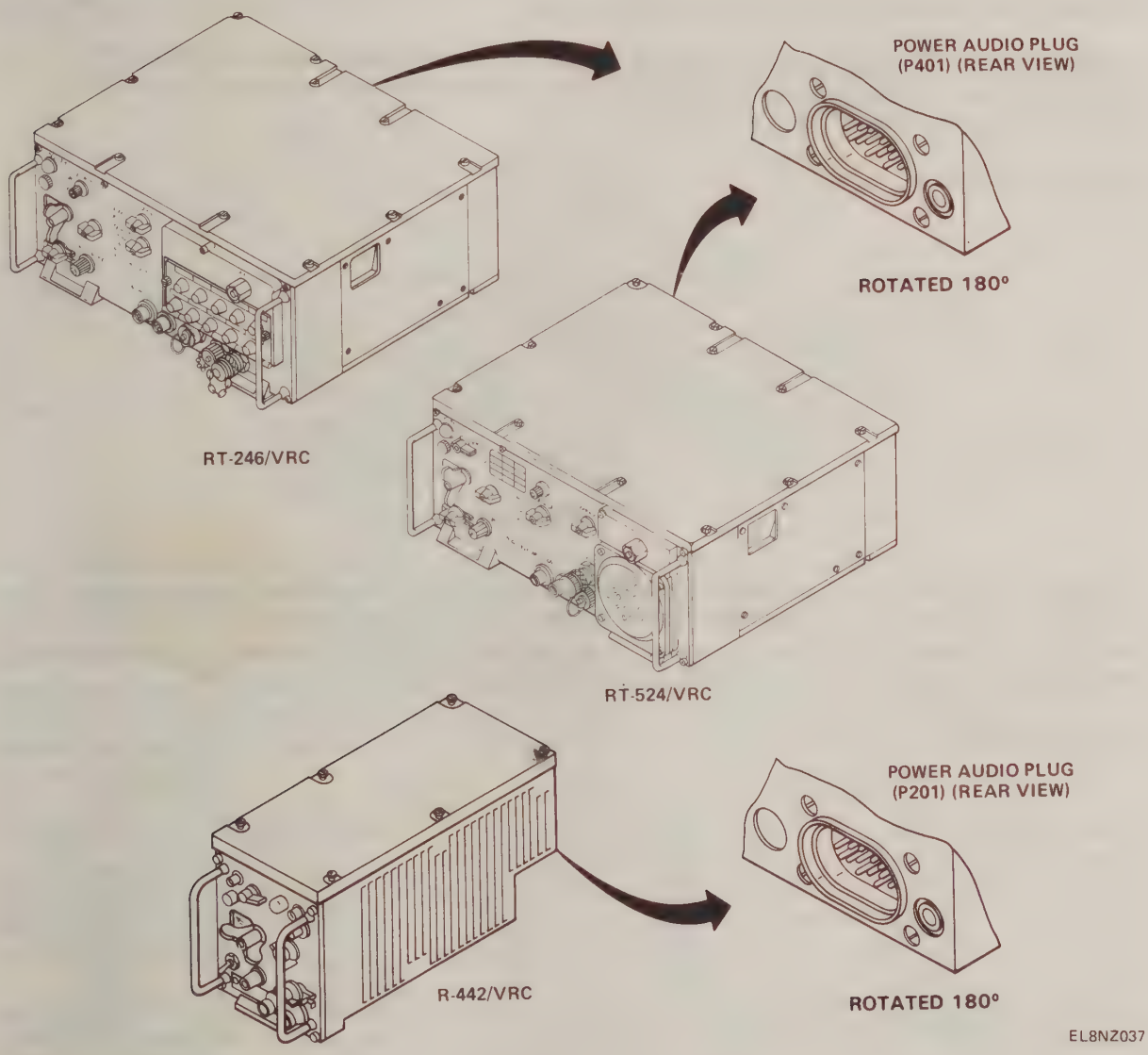
RADIO SET COMPONENTS: AN/VRC-12 SERIES (CONT)



The Auxiliary Receiver R-442/VRC is used for the AN/VRC-12, AN/VRC-44, AN/VRC-47 and AN/VRC-48 radio sets.

The AN/VRC-12 series radio set components need interconnecting cables, dc power, radio control boxes and audio accessories to be operational. Input dc voltage (22 to 30v) is provided by vehicular electrical power.

1-11. DESCRIPTION OF COMPONENTS. (CONT)



The radios, RT-246/VRC, RT-524/VRC and the R-442/VRC, are rugged, lightweight, compact FM radio units. They are housed in waterproof cases. All the operating cables are on the front panel. On each of the three units, the plug at their rear mates with the junction box jack on the rear wall of the radio mount.

A blower inside each RT aids in cooling the equipment. The top and bottom covers of all radio components are held by captive screws.

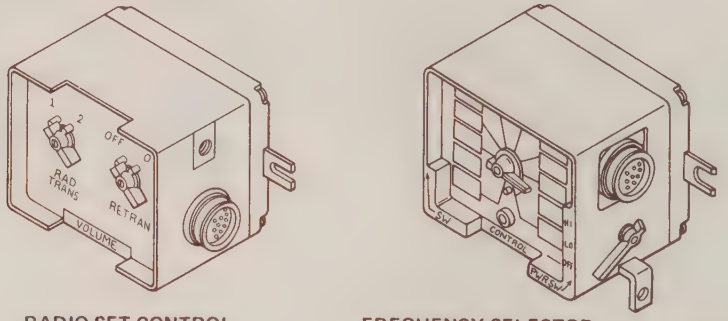
All configurations in the AN/VRC-12 series have at least one RT (RT-246/VRC or RT-524/VRC). Each RT has its own antenna (AS-1729/VRC and AT-912/VRC). Each RT is secured to its own mounting (MT-1029/VRC). Four of the configurations (AN/VRC-12, -44, -47, -48) have aux receiver(s) (R-442/VRC). Each of the aux receivers is secured to its own mounting (MT-1898/VRC).

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RADIO SET COMPONENTS: AN/VRC-12 SERIES (CONT)

The R-442/VRC has an antenna which consists of three whip antenna elements attached to one Antenna Base AB-15/GR or the AB-558/GR. Only one aux receiver antenna is used with any of the four configurations AN/VRC-12, -44, -47 or -48.

Radio Control Boxes



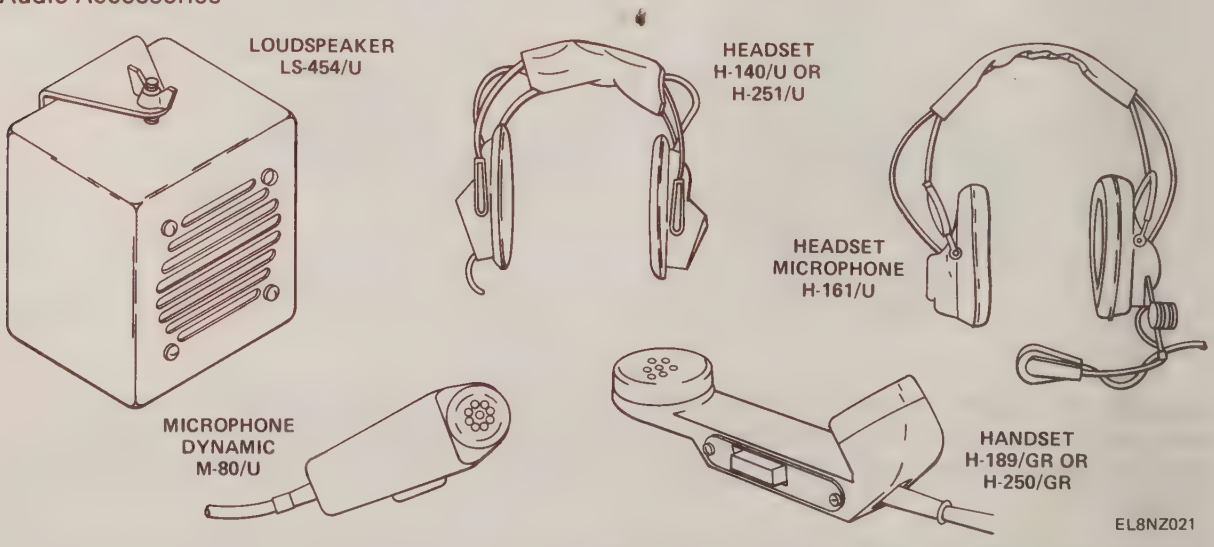
RADIO SET CONTROL BOX C-2299/VRC

FREQUENCY SELECTOR CONTROL BOX C-2742/VRC

EL8NZ020

The Radio Control Boxes C-2299/VRC and C-2742/VRC work with the RT-246/VRC in configurations AN/VRC-12, -43, -44 and -45. The C-2299/VRC works with any of the eight AN/VRC-12 series configurations to extend audio accessory function. It is used in AN/VRC-45 and -49 for retransmission (relay). The C-2742 works with the RT-246/VRC to remotely control application of power.

Audio Accessories

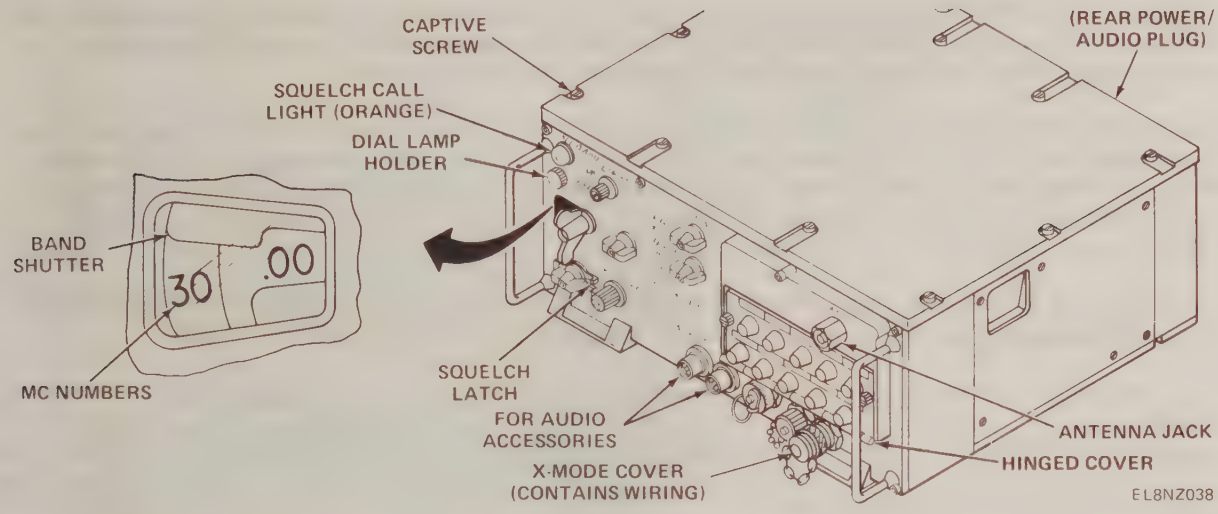


EL8NZ021

Audio accessories and some interconnecting cables for the radio sets are issued as part of each vehicle's installation kit.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RECEIVER-TRANSMITTER RT-246/VRC



The RT-246/VRC provides two-way FM radio communication on a push-to-talk/release-to-listen basis. It contains ten pushbuttons, which, when preset, provide automatic access to any one of ten preset frequencies. All operational controls and jacks are on the front panel.

The POWER switch (OFF-BREAKER RESET/LOW/HIGH/REMOTE) is used to turn the RT on or off and provides circuit breaker (overload) reset. It can also turn on and off all other components connected to the RT. The POWER switch also establishes the rf output power level (LOW or HIGH) of its transmitter. The REMOTE setting is used when a Remote Box C-2742 is connected to the REMOTE jack on the RT front panel.

The LIGHT switch controls the power to the dial lamp and the CALL lamp. It turns the lamps on and off.

The BAND switch selects the tuning range for manual tuning; BAND A (30.00 to 52.95 MHz) or BAND B (53.00 to 75.95 MHz). The MC control provides manual tuning of the RT in 1-MHz steps (30, 31; 53, 54, etc). The KC control provides manual tuning of the RT in 0.05-MHz steps (.00, .05, .10, etc). A protective shutter covers the MC numbers of the band not used.

When the BAND switch is set at AUTO, band selection and the actual operating frequency is determined by the pushbutton that is pressed in. (Instructions for presetting the ten pushbuttons to desired operating (channel) frequencies are on the back side of the pushbutton hinged cover.)

The ANT and ANT CONT jacks provide the connections for two cables to connect the RT antenna to the RT. The ANT jack connects an rf cable (CG-1773/U) to provide the rf signal path. The ANT CONT connects the control cable (CX-4722) to the RT. This provides for tuning the antenna elements according to operating frequency.

The two MIKE jacks provide connection for a variety of audio accessories (e.g., an external loudspeaker, headphones, microphones, handsets and combination headphone/microphone).

The VOLUME control adjusts the loudness of signals heard from any audio accessory connected to the MIKE jacks.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RECEIVER-TRANSMITTER RT-246/VRC (CONT)

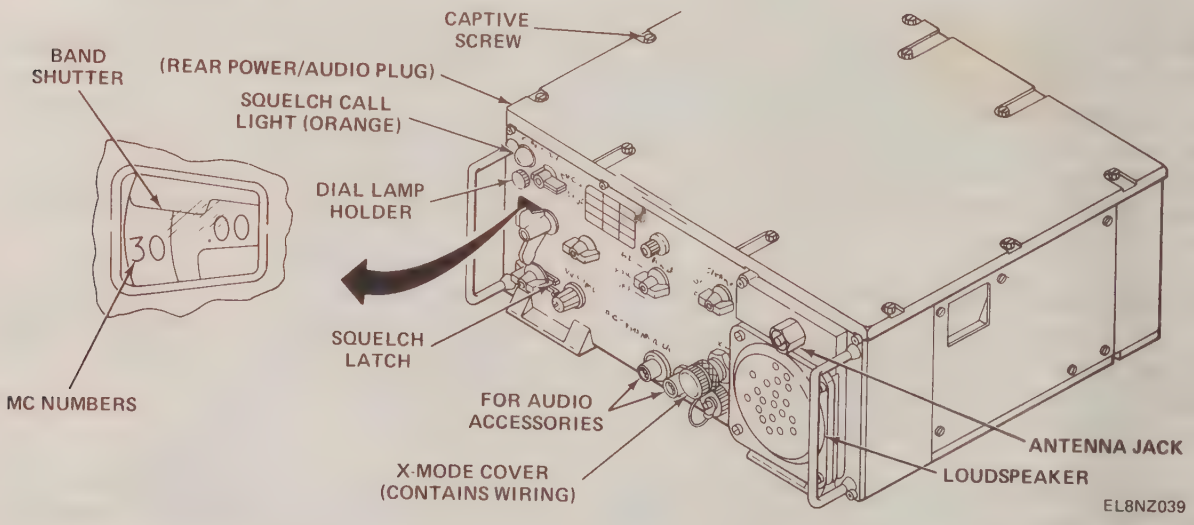
The SQUELCH switch has four positions. If a signal is not received and the SQUELCH is in either of its OFF positions, a random noise (called rushing noise) is produced by the RT receiver. The rushing noise will be passed to the audio reproducers and heard as a hissing sound.

If a signal is not received, and the SQUELCH is in either of its ON positions, the RT squelch circuit will be activated and the audio reproducer will be quieted. For this situation, when a signal is received or the RT is keyed, the RT squelch circuit will automatically be deactivated. The received signal or noise sidetone signal will be heard from the RT audio reproducer. When the squelch deactivates, the RT's CALL lamp will also light (if the RT's light switch is ON).

The CALL lamp shows that a signal is being received when the SQUELCH control is set to NEW ON or OLD ON. When the squelch deactivates, the CALL lamp will light (if LIGHT switch is at ON).

An X-mode jack is provided for connecting the RT to additional equipment for speech-secure transmission. When this is the case, an X-mode switch inside the RT must be set to X-mode. When secure equipment is not provided, the X-mode plug must be placed on the X-mode jack.

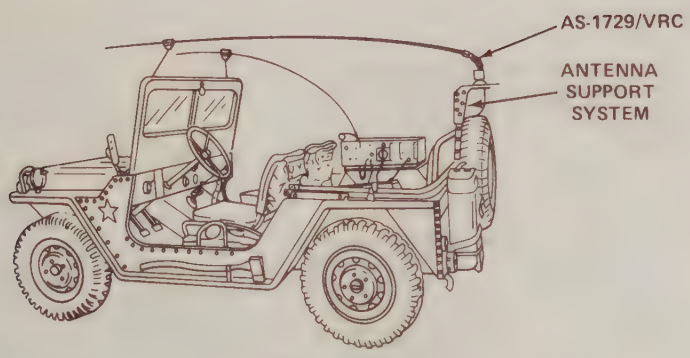
RECEIVER-TRANSMITTER RT-524/VRC



The RT-524/VRC provides the same functions and has the same features as the RT-246, except that there are no provisions for automatic pushbuttons tuning and remote control from a C-2742. Instead of these features, the RT-524 has a built-in loudspeaker (the RT-246 does not). The front panel SPEAKER switch is used to turn the built-in speaker on and off.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RECEIVER-TRANSMITTER ANTENNAS



EL8NZ022

AT-912/VRC, AS-1729/VRC

The AT-912/VRC and the AS-1729/VRC are used with the RT-246 and RT-524. Both antennas receive and transmit signals for the receiver-transmitters. Each antenna has a matching unit and two antenna elements.

Both matching units will automatically tune their antenna elements according to tuning voltages applied from the associated RT through a control cable(s). The MX-6707 has a switch on its base for manual tuning when the control cable is disconnected. The MX-2799 has no provisions for manual tuning.

The matching base unit acts as a base for the antenna elements. The spring assembly in the matching unit allows the antenna element to bend easily when it strikes an obstruction.

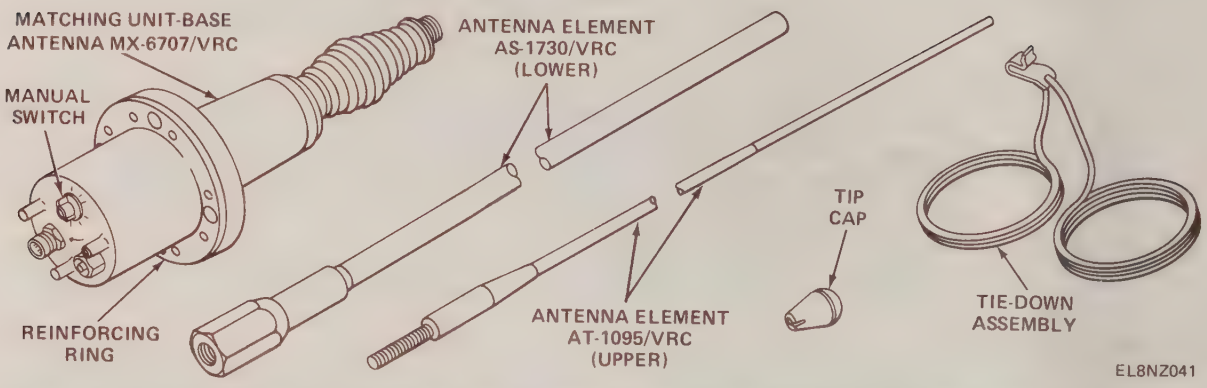
The antenna elements are used to radiate (transmit) signals during transmission and to collect (receive) signals when receiving.

The antenna support system secures the antenna system to the vehicle.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RECEIVER-TRANSMITTER ANTENNAS (CONT)

Antenna AS-1729/VRC (Round Base)



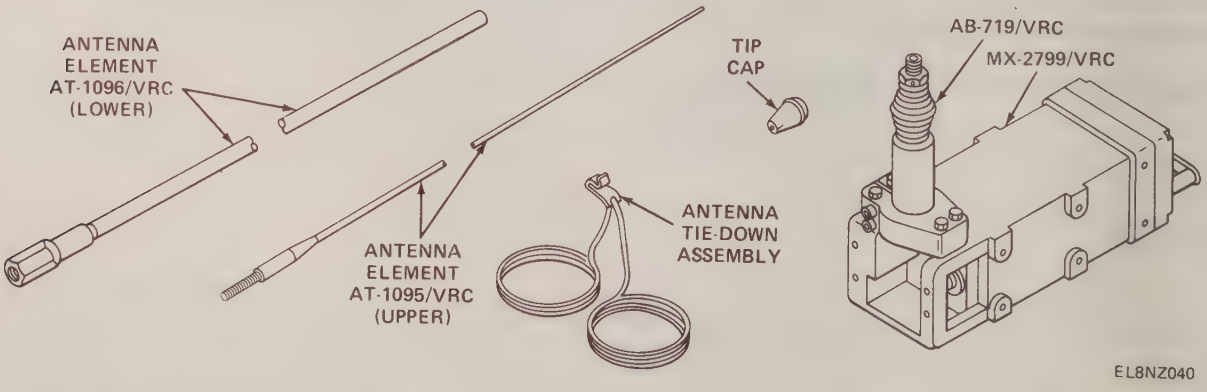
The AS-1729/VRC is used with vehicles which have the radio sets AN/VRC-12 and AN/VRC-43 through AN/VRC-49. The Antenna AS-1729 consists of two whip antenna elements (AT-1095/VRC and AS-1730/VRC), a tip cap, the Matching Unit MX-6707/VRC and miscellaneous hardware.

The MX-6707/VRC tunes the antenna elements either by automatic or manual selection. The manual tuning switch is on the bottom of the matching unit.

NOTE

Disconnect the cables before manually tuning the antenna matching unit.

Antenna AT-912/VRC (Square Base)

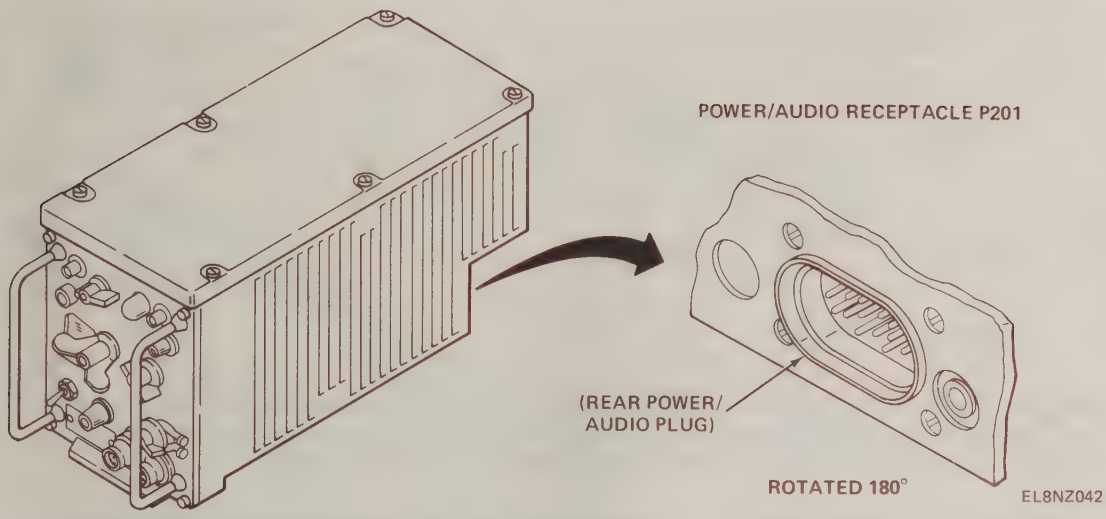


The Antenna AT-912/VRC consists of two whip antenna elements (AT-1095/VRC and AT-1096/VRC), a tip cap, antenna support equipment, antenna tiedown assembly and Matching Unit MX-2799/VRC.

When RT Control Cable CX-4722 is connected to the matching unit, the MX-2799/VRC automatically tunes the antenna elements to the transmitting frequency of the receiver-transmitter.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AUX RECEIVER R-442/VRC



The Aux Receiver R-442/VRC provides receive-only FM radio communications from a distant station. It is used as part(s) of the configurations AN/VRC-12, -44, -47, and -48. For these configurations, the R-442(s) will be operated on a channel frequency other than the associated RT.

The POWER switch is used to turn the aux receiver on and off.

The LIGHT switch controls dc power to the dial window lamp and SQUELCH call indicator.

The BAND switch selects tuning of frequency band A (30.00 to 52.95 MHz) or band B (53.00 to 75.95 MHz). In the KC function, the TUNE control provides manual tuning of the receiver in 0.05-MHz steps (.00, .05, .10 etc). In the MC position, the TUNE control provides manual tuning of the receiver in 1-MHz steps (30, 31, 32, etc).

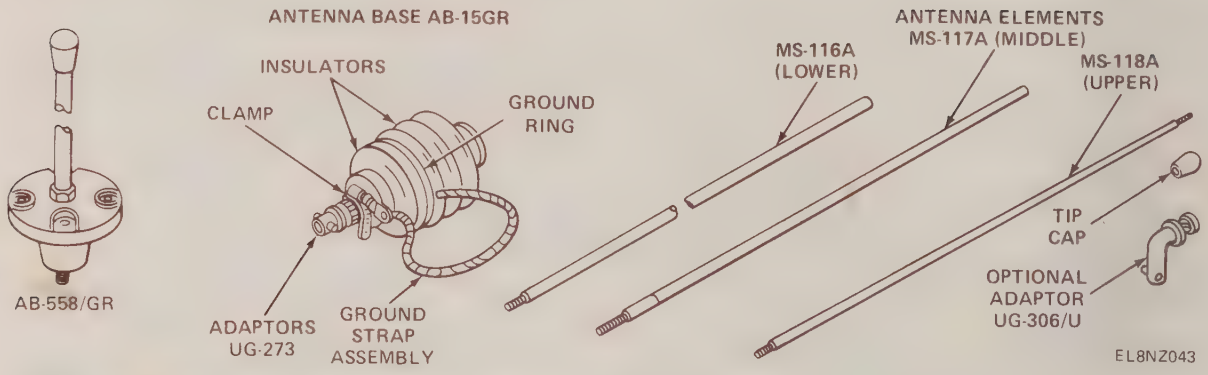
Two AUDIO jacks, wired in parallel with each other, may be used to connect audio accessories such as headsets and loudspeakers.

The VOLUME control adjusts the loudness of signals heard from any audio accessory connected to the audio jacks.

Two ANT jacks (wired in parallel) are provided to connect an rf cable from the auxiliary receiver antenna to the receiver (B-RCVR). When there is a second receiver (C-RCVR), as in AN/VRC-44 or -48, the unused ANT jack on the B-RCVR is connected by rf cable to either ANT jack on the C-RCVR so that both receivers use the same auxiliary receiver antenna.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AUX RECEIVER ANTENNA SYSTEMS



The antennas for the Auxiliary Receiver R-442 consist of three whip antenna elements (MS-116A, MS-117A, and MS-118A), a tip cap, the tiedown assembly (not illustrated), an adaptor (UG-273/U) and a base (AB-15/GR or AB-558/GR). The base has no tuning circuits.

The upper section of both bases have a shaft with a spring section. The spring section allows the antenna elements to bend easily when the antenna strikes an obstruction. Both bases have a ground strap assembly which consists of a ground wire and a ground clamp. The ground ring rests on a rubber washer. After the antenna is mounted, the ground clamp completes the ground when connected to the Adaptor UG-273/U.

The antenna elements are used to collect (receive) signals.

The Adaptor UG-273/U is needed to connect the aux receiver rf cable to the antenna base jack.

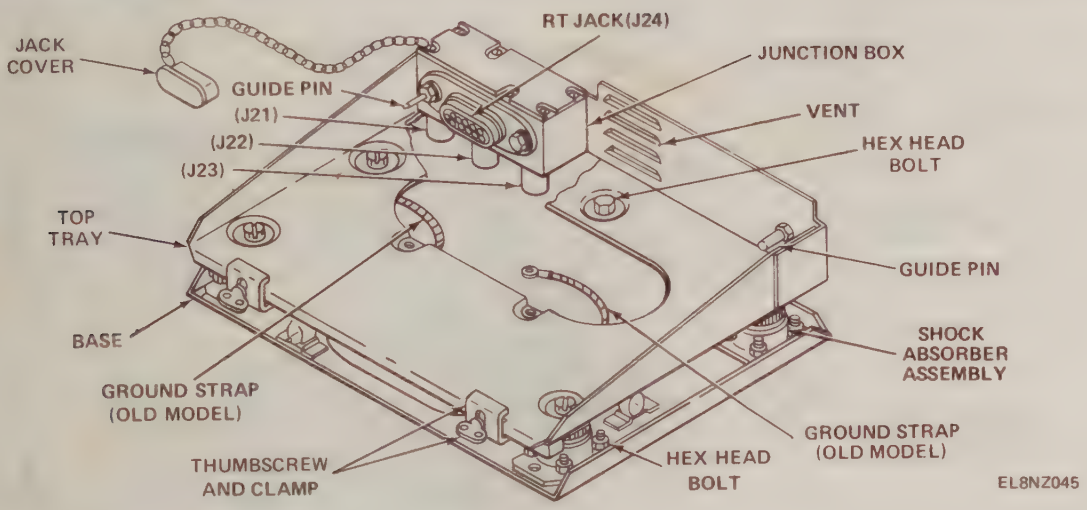
The Adaptor UG-306/U is an optional adaptor used in some installations. This optional adaptor is used when a right-angle connection is required to prevent damage to rf cable.

NOTE

The Antenna Element AT-1095/VRC may be substituted for the normally used three elements (MS-116A, MS-117A, and MS-118A).

1-11. DESCRIPTION OF COMPONENTS. (CONT)

MOUNTING MT-1029/VRC



The Mounting MT-1029/VRC is used to hold the RT-246/VRC and RT-524/VRC in a vehicle.

The MT-1029/VRC consists of an upper tray and a lower base. They are connected to each other by five bolts and shock absorber assemblies. A grounding strap is connected between the upper tray and lower base to insure good grounding. (Earlier models (before 1973) have two grounding straps.)

The lower base is bolted to the radio shelf of the vehicle. The upper tray has two thumbscrews and clamp assemblies. These lock the RT in place. Two guide pins at the rear of the upper tray aid in holding the RT. They insure the proper alinement of the RT's star plug (P401) with the mount jack (J24).

A gasket-sealed junction box (J-box) is at the left side at the MT-1029/VRC rear wall. The RT jack, J24, is on the front of the J-box. There are three jacks on the bottom. From left to right, is a power input jack, J21, an additional equipment convenience jack, J22, and a power outlet jack, J23.

The J-box obtains RT operating voltage (22 to 30 vdc) from the vehicle electrical system at J21 and applies it to the RT at J24. The J-box jacks, J22 and J23, also distribute power, control, and signal voltages between the installed RT and other equipment of the vehicle's communication system.

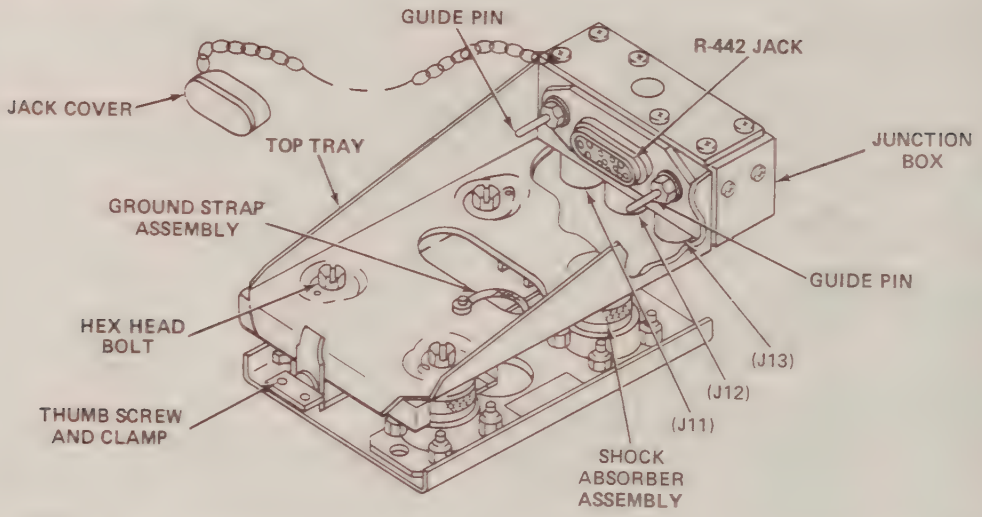
The earlier models (before 1973) have a 100-ampere fuse (as part of the J-box cover) for protection of the vehicle electrical system.

A vent (opening) is at the center of the rear wall. The vent alines with the installed RT exhaust blower. The vent and the exhaust blower must be kept clear of any obstructions to insure proper cooling of the RT.

Vinson speech-secure equipment (TSEC/KY-57) can be connected to the RT when interconnecting box J-3513/U is installed between the mount's upper tray and the lower base.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

MOUNTING MT-1898/VRC



The Mounting MT-1898/VRC is used to hold the Aux Receiver R-442/VRC in a vehicle.

The MT-1898/VRC consists of an upper tray and a lower base. They are connected to each other by four bolts and shock absorber assemblies. A grounding strap is connected between the upper tray and lower base to insure good grounding.

The lower base is bolted to the radio shelf of the vehicle. The upper tray has one thumbscrew and clamp assembly. It locks the R-442/VRC. Two guide pins at the rear of the upper tray aid in holding the R-442/VRC. They insure the proper alinement of the R-442/VRC rear plug (P201) with the mount jack (J14).

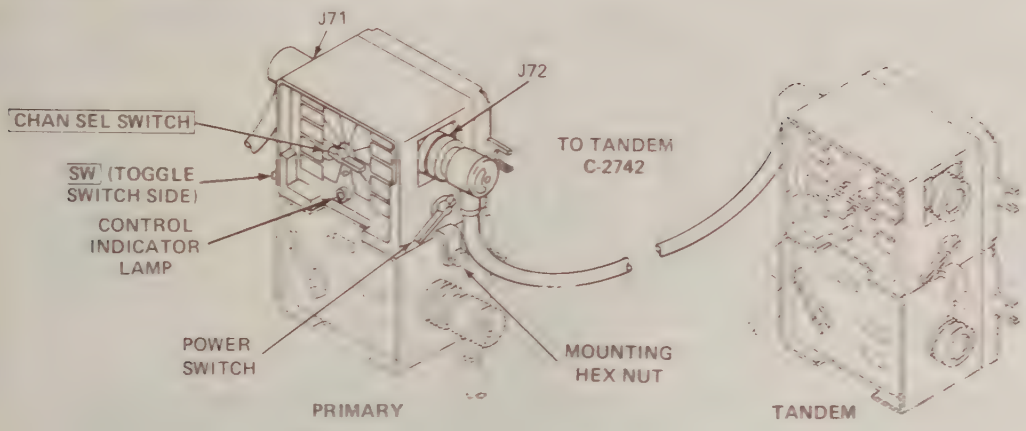
A gasket-sealed junction box (J-box) is at the center of the MT-1898/VRC rear wall. The R-442/VRC jack (J14) is on the front of the J-box. There are three jacks on the bottom. From left to right, is a power input jack (J11), an additional equipment convenience jack (J12), and a power outlet jack (J13).

The J-box obtains operating voltage (22 to 30 vdc) from the A-RT mount through its power input jack, J11. Jacks J12 and J13 also distribute power and signal voltages between the installed R-442/VRC and other equipment of the vehicle's communication system.

Vinson speech-secure equipment (TSEC/KY-57) can be connected to the receiver when interconnecting box J-3514/U is installed between the mount's upper tray and the lower base.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

FREQUENCY SELECTOR CONTROL BOX C-2742/VRC



The Control Frequency Selector (Remote Box) C-2742/VRC is used exclusively with the RT-246/VRC. It permits three remote functions: remote R-246/VRC input power control, remote selection of RT -246 rf transmit power level (low or high), and remote selection of any one of ten preset frequencies.

In some configurations, two C-2742/VRC boxes can connect in tandem. In this case, the C-2742/VRC directly connected to the RT-246/VRC is called the primary C-2742/VRC. The one connected to the primary C-2742/VRC is called the tandem C-2742/VRC. Only one C-2742/VRC at a time can be used to remotely select the RT-246/VRC rf transmit level and preset channel frequency.

The primary C-2742/VRC (J71) provides a connection to the RT-246/VRC. When it is a tandem C-2742/VRC, J71 provides a connection to the primary C-2742/VRC, jack, J72. When it is a tandem C-2742/VRC, J72 has no connection.

The C-2742/VRC PWR (power) switch is used to turn the RT-246/VRC on and off (HI/LO and OFF). It also selects the RT-246/VRC rf transmit power level (HI or LO). Only a primary C-2742/VRC PWR switch can be used to turn the RT-246/VRC on and off.

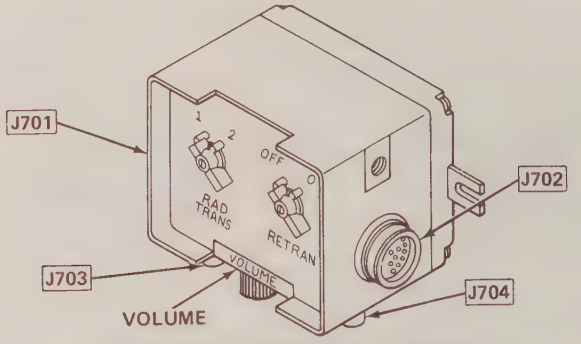
The SW (toggle) switch is used to establish remote control at a specific remote box. This switch is spring-held in its forward position. When the primary C-2742/VRC power switch is at HI or LO (RT-246/VRC is on) pushing and releasing the switch establishes the remote selection of RT-246/VRC transmit rf power level. It also establishes remote selection of preset channel frequency at the C-2742/VRC whose SW switch is activated.

The CONTROL lamp is located on the C-2742/VRC front panel. It lights to indicate the controlling remote box. (When in tandem, only one control lamp should be lit at one time.)

The CHAN SEL (channel selector) is a ten position switch with write-in spaces for each position. Progressing clockwise, the lower left write-in position corresponds with pushbutton number 1, the next write-in position corresponds with pushbutton number 2, the next with number 3, and so forth, to the lower right write-in position, which corresponds with pushbutton number 10.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

RADIO RELAY CONTROL BOX C-2299/VRC



RADIO SET CONTROL BOX C-2299/VRC EL8NZ025

The Radio Relay Control Box C-2299/VRC is used between receiver-transmitters of radio sets AN/VRC-45 and AN/VRC-49. In these configurations, the C-2299 provides for automatic radio relay (retransmission) operation for distant radio stations that are too far apart to communicate directly with each other. The C-2299 has a different function in the six other AN/VRC-12 radio sets installed in wheeled vehicles. It can be used to extend an RT's audio accessory functions to a more convenient location in the vehicle.

Jack J701 (on the left side of C-2299) provides a connection to the installed A-RT's MT-1029 (J22) for all eight configurations.

Jack J702 (on the right side of C-2299) provides a connection to the installed C-RT's MT-1029 (J22) for configurations AN/VRC-45 and AN/VRC-49.

The RETRANS switch (on the front panel) provides relay or independent operation of the two RT's in the AN/VRC-45 or AN/VRC-49 configuration. When at OFF, independent operation of the two RT's is provided by the audio accessories connected to the five-pin audio jacks, J703 and J704 (on the bottom). When the RETRANS is ON, automatic relay operation is provided, but the independent operation is not.

The RAD TRANS switch (on the front panel) provides for selection of the RT to be independently operated (RETRANS at OFF). Position 1 selects the A-RT. Position 2 select the C-RT.

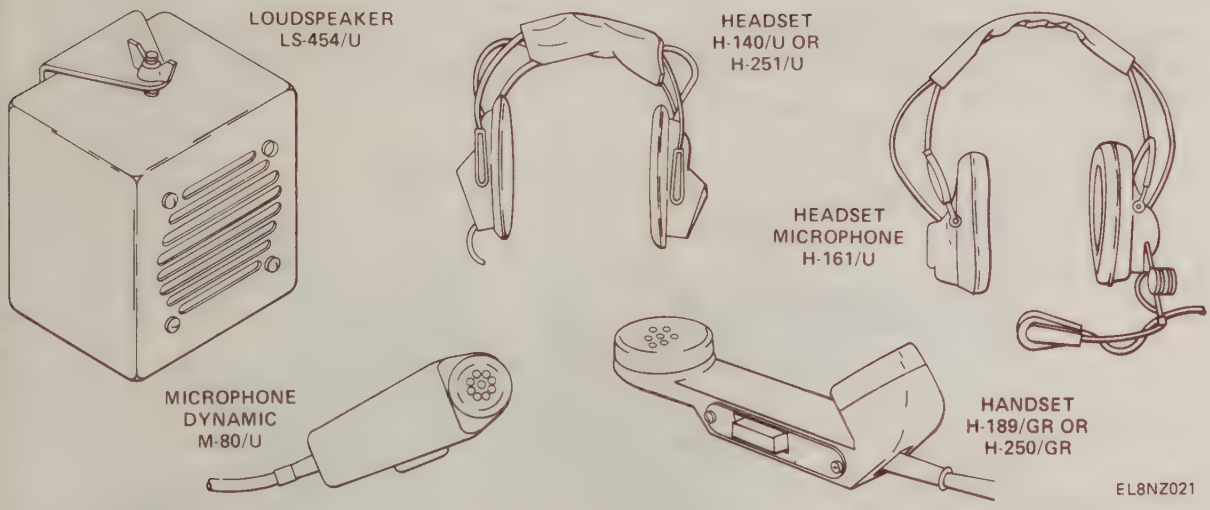
For independent operation, J703 and J704 connect the audio accessories to the selected RT. (These jacks are wired in parallel and will accommodate a variety of audio accessory types.)

The VOLUME control (on bottom) provides for adjusting the loudness of audio signals heard from the audio reproducer connected to the C-2299.

For AN/VRC-12, -43, -46, -47 and -48 configurations, the C-2299 can be used to extend the audio accessory functions of the A-RT. (Audio reproducer function of R-442's cannot be extended to a C-2299.) When this is the case, the C-2299's RETRANS switch remains at OFF and RAD TRANS switch remains at 1.

1-11. DESCRIPTION OF COMPONENTS. (CONT)

AUDIO ACCESSORIES



Typical audio accessories include a loudspeaker, microphone, headset and a handset. They allow the crewmembers use of the vehicular communication system.

The dynamic microphone (M-80/U) is provided with a push-to-talk/release-to-listen (key) switch.

Typical handsets are the H-189/GR and the H-250/U. They are provided with a microphone, an earphone and a push-to-talk/release-to-listen (key) switch.

The Headsets H-140/ and H-251/U and the Loudspeaker LS-454/U are audio reproducers only.

The Headset H-161/U consists of a microphone, earphone and a key switch. The key switch has three positions. The center position, OFF, has a release-to-listen action. The RAD position has a spring-loaded, push-to-talk action. INT is not used in wheeled vehicles.

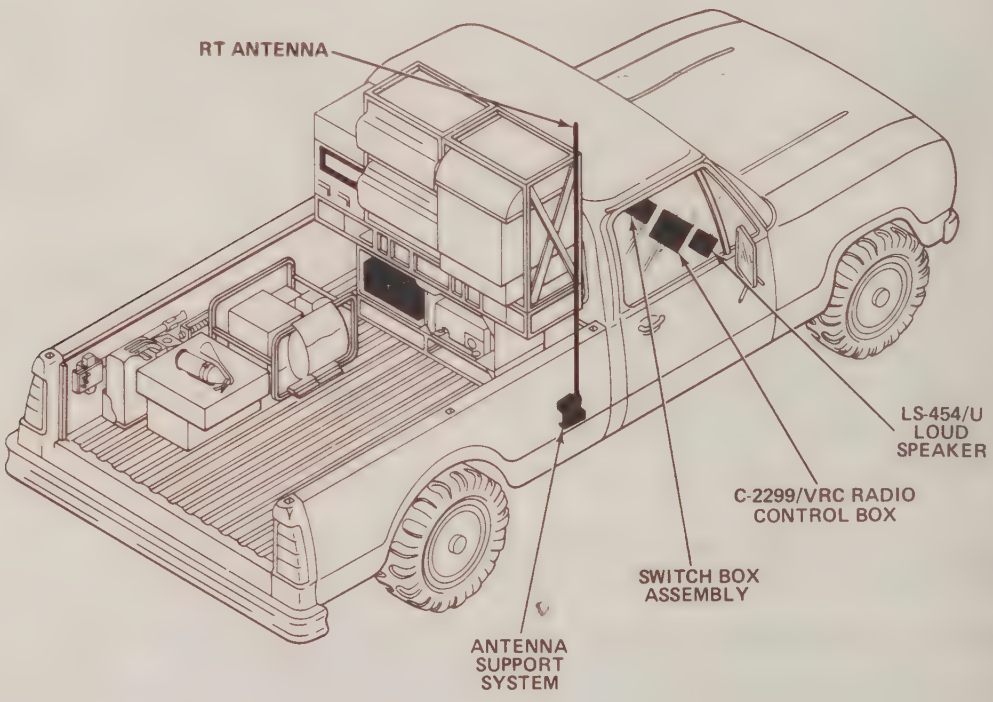
All the audio accessories may be connected to the C-2299/VRC or the audio jacks on the radio components.

AUDIO ACCESSORY CONNECTIONS: See FO-1.

1-12. LOCATION OF MAJOR COMPONENTS AND CABLING FOR M882.

NOTE

The vehicles described in this manual have the ability to have Vinson Security Equipment installed. See TM 11-5820-312-12 for installation and operation. See paragraph 1-11 for complete functions.



EL8NZ023

The M882 is a 1 1/4-ton, general purpose cargo truck. It has an installed communications equipment rack. The AN/VRC-12 series radio set used for this vehicle can be the AN/VRC-46 (shown), -12 or -47. The Radio Control Box C-2299/VRC, Loudspeaker LS-454/U and the special switch box assembly complete the radio communication set.

The RT-524/VRC (AN/VRC-46) is on the lower center mounting surface of the equipment rack just behind the cab in the rear of the truck.

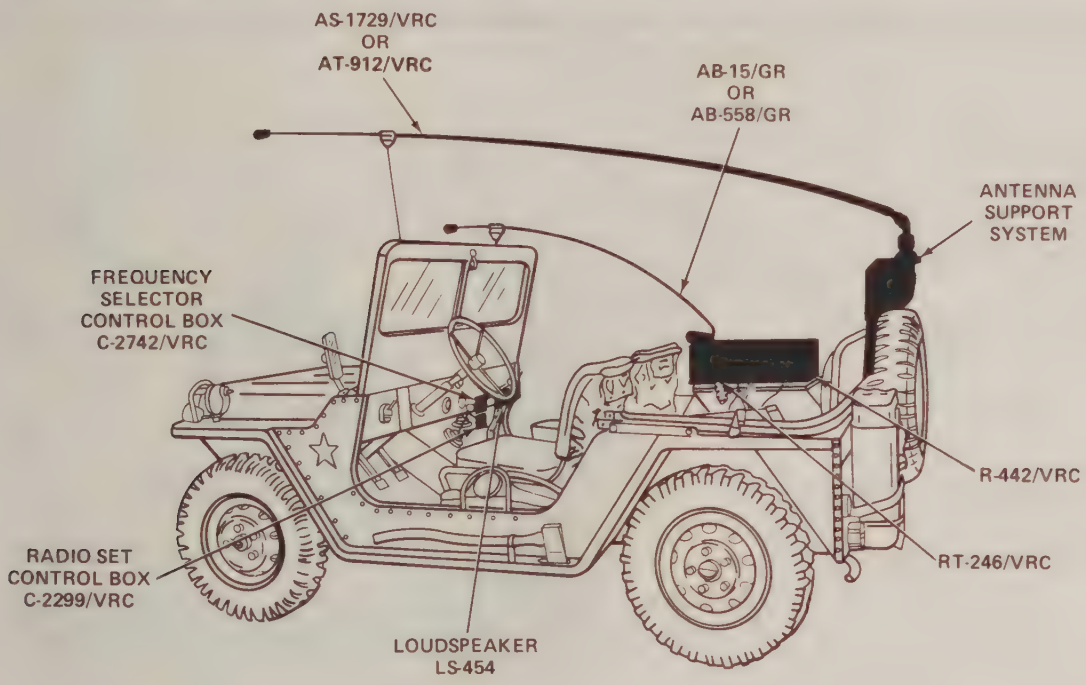
The Antenna AS-1729/VRC (or AT-912/VRC) is secured to the antenna support assembly. The antenna support assembly is mounted to the curbside center of the outer panel of the vehicle.

The Radio Control Box C-2299/VRC is mounted between the loudspeaker and the switch box on the curbside dashboard. The switch box is to the left. The loudspeaker is to the right.

The switch box remotely controls the power to the RT (ON and OFF). The front panel contains an indicator lamp which lights when the RT is keyed.

CABLING: See chapter 2, section III, and paragraph 3-22.

1-13. LOCATION OF MAJOR COMPONENTS AND CABLING FOR M151.



EL8NZ024

The M151 is a ¼-ton utility truck (jeep) used for transporting personnel and general cargo. The AN/VRC-12 series radio sets used for this vehicle can be the AN/VRC-12 (shown), or AN/VRC-43 through -49. The Radio Control Box C-2299/VRC, the Frequency Selector Box C-2742/VRC and the Loudspeaker LS-454/U complete the AN/VRC-12 radio set.

The RT-246/VRC and the R-442/VRC (AN/VRC-12) are mounted on the rear curbside fender (sponson) directly behind the passenger seat. The R-442/VRC is to the right of the RT-246/VRC.

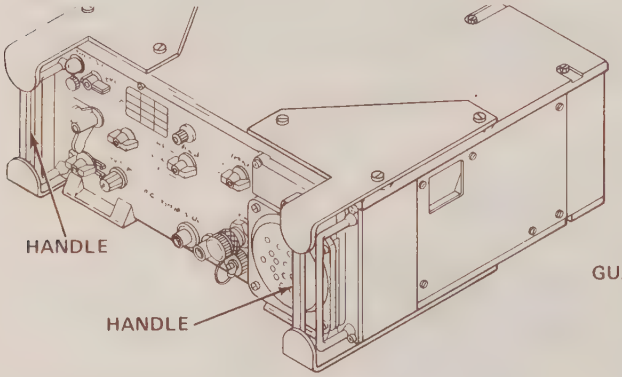
The M151 dashboard has the Radio Control Box C-2299/VRC, the Frequency Selector Box C-2742/VRC and the Loudspeaker LS-454/U mounted to it. The C-2742/VRC is usually mounted on top of the C-2299/VRC, right of the driver's seat. The Loudspeaker LS-454/U is to the far right, in front of the passenger seat.

The RT antenna and the aux receiver antenna are each secured to an antenna support assembly. The AS-1729/VRC (or AT-912/VRC) is mounted at the curbside rear. The Aux Receiver Antenna System AB-15/GR (or AB-558/GR) is mounted curbside next to the RT.

CABLING: See chapter 2, section III, and paragraph 3-22.

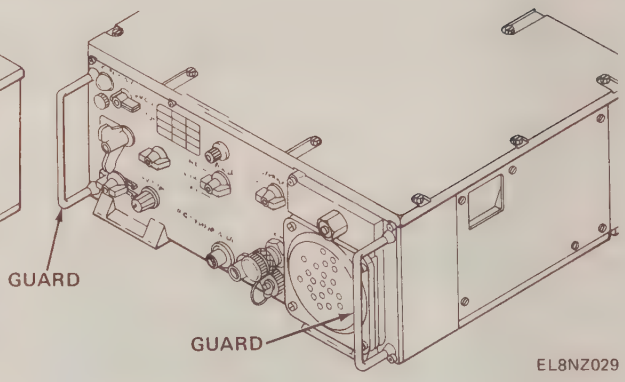
1-14. DIFFERENCES BETWEEN MODELS.

RECEIVER-TRANSMITTERS: RT-524/VRC AND RT-524A/VRC
RT-246/VRC AND RT-246A/VRC



RT-524/VRC OR RT-246/VRC

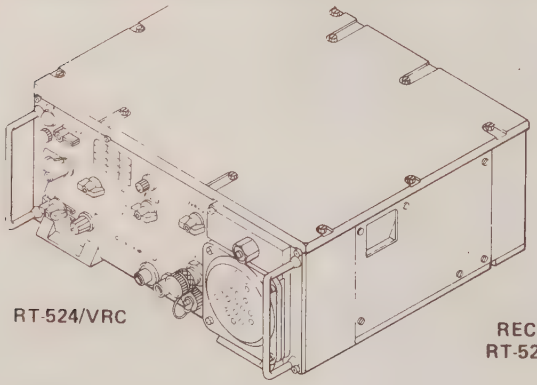
Has handles over small guards.



RT-524A/VRC OR RT-246A/VRC

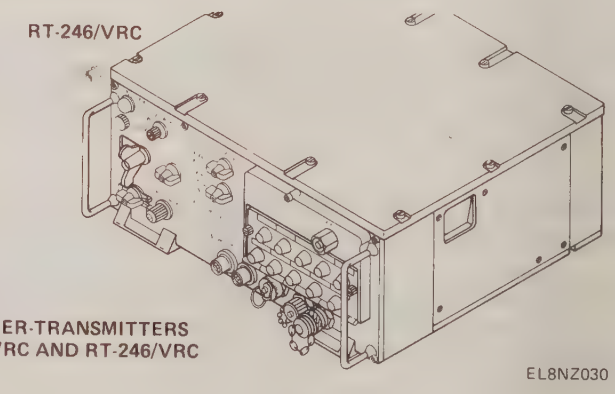
Has larger, stronger guards which can be used as handles.

RECEIVER-TRANSMITTERS RT-524(*)/VRC AND RT-246(*)/VRC



RT-524(*)/VRC

Has a built-in loudspeaker and a speaker switch.

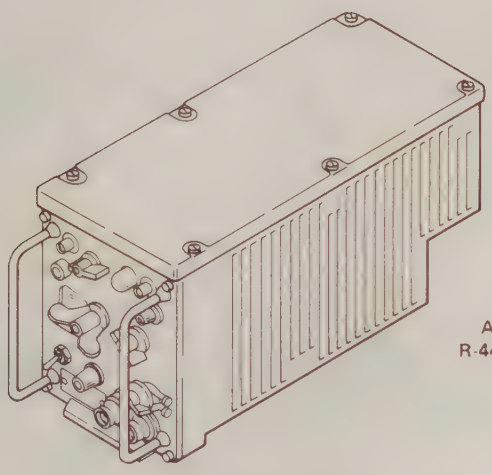


RT-246(*)/VRC

Has pushbutton remote and tuning control capability and doesn't have a built-in loudspeaker.

1-14. DIFFERENCES BETWEEN MODELS. (CONT)

AUXILIARY RECEIVERS R-442/VRC AND R-442A/VRC

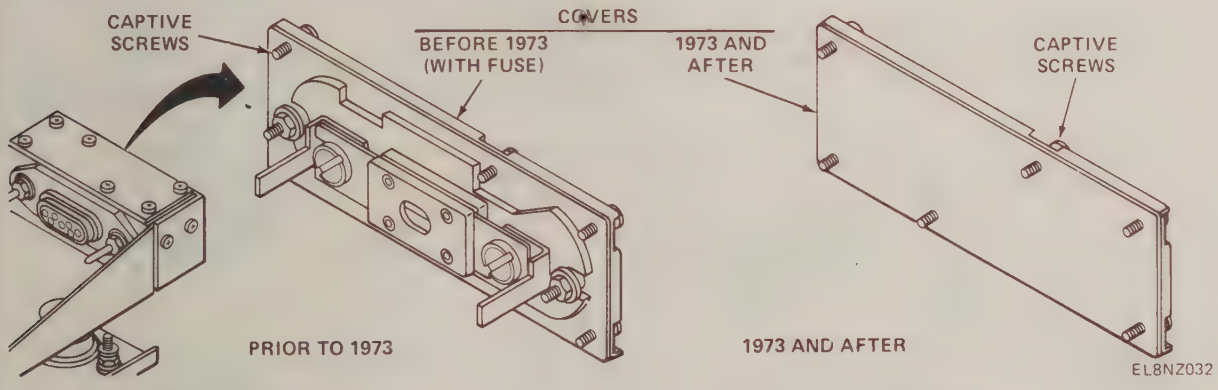


AUXILIARY RECEIVERS
R-442/VRC AND R-442A/VRC

EL8NZ031

All features of the R-442/VRC and the R-442A/VRC are the same except the R-442A/VRC has the same tuner voltage regulator as the RT-524A/VRC or the RT-246A/VRC.

MOUNTS MT-1029/VRC AND MT-1898/VRC: BEFORE 1973 AND 1973 AND AFTER



PRIOR TO 1973

The J-box cover has a fuse. In addition, the captive screws of the cover are the slotted type.

There are two grounding straps (in MT-1029 only).

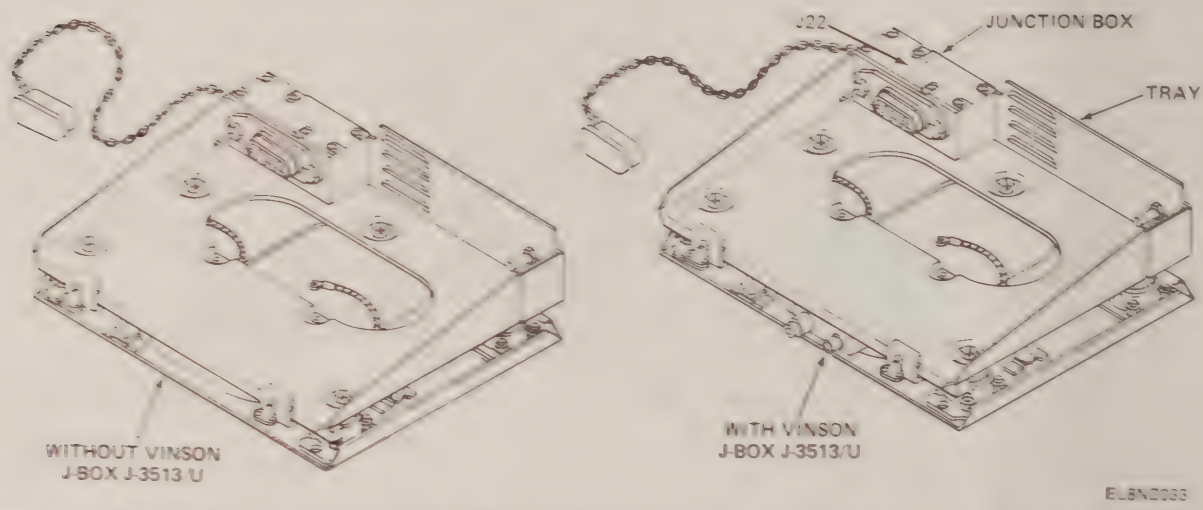
1973 AND AFTER

The J-box cover has no fuse and the captive screws are phillips-head type.

There is one grounding strap.

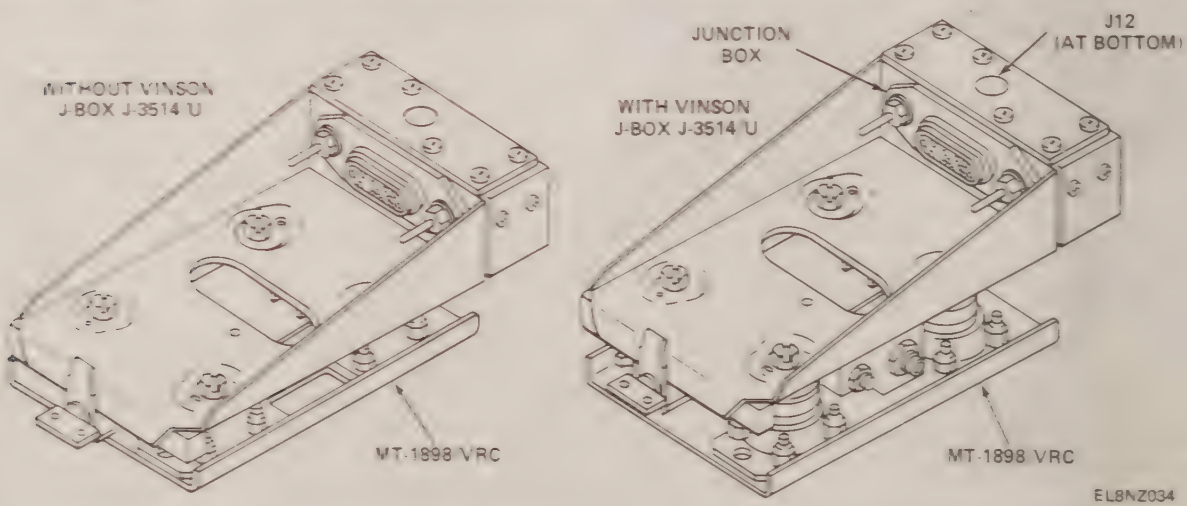
1-14. DIFFERENCES BETWEEN MODELS. (CONT)

MOUNT MT-1029/VRC. WITH AND WITHOUT VINSON J-BOX J-3513/U (NO FUSE)



The Vinson J-box J-3513/U is mounted on the shock absorbers, sandwiched between the base and the tray of the mounting MT-1029/VRC. The Vinson plug (P1) connects with mounting jack (J22). There is no ground strap used with the Vinson J-box. A wire is added between J14 Pin C and J12 Pin C inside the mount J-box.

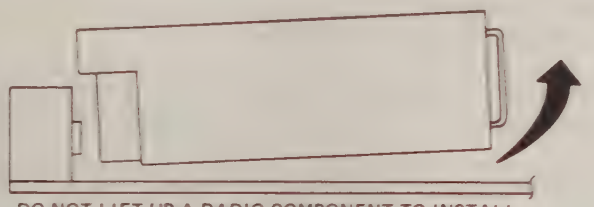
MOUNT MT-1898/VRC. WITH AND WITHOUT VINSON J-BOX J-3514/U



The Vinson J-box J-3514/U is mounted on the shock absorbers, sandwiched between the base and the tray of the mounting MT-1898/VRC. The Vinson plug (P1) connects with the mounting jack (J12). There is no ground strap used with the Vinson J-box. A wire is added between J14 Pin C and J12 Pin C inside the mount J-box (for details, see TM 11-5810-312-12).

1-15. SAFETY, CARE AND HANDLING.

Make sure the RT mounting clamp assemblies are locked to hold the radio component securely in the radio mount while the vehicle is in motion. Do not set the receiver-transmitter on the rear of the unit. The blower assembly may be damaged by such things as stones, metal objects and mud lying on the ground or floor.



DO NOT LIFT UP A RADIO COMPONENT TO INSTALL OR REMOVE IT FROM ITS MOUNTING

EL8NZ180

When removing the receiver-transmitter or receiver from the RT mounting, pull it straight out and then put the electrical connector cover on all exposed radio jacks of the mount to protect the jack pins from the effects of weather and dirt.

Make sure radio set is turned off before starting vehicle.

When using radio equipment for prolonged periods of time (more than 15 minutes), make sure vehicle is running, or battery may become discharged.

Do not use radio components for steps, or cables for handrails.

Section III PRINCIPLES OF OPERATION

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B-Receiver, C-Receiver, and C-RT Power Input Circuit	1-18	1-34
Antenna Matching Unit, Purpose and Control	1-19	1-36
Receiver Signal Path	1-20	1-37
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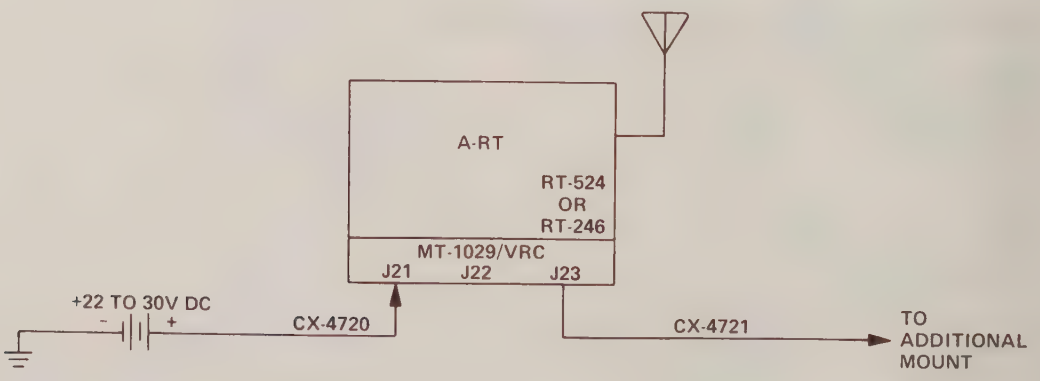
1-16. GENERAL.

This section covers the principles of operation of the AN/VRC-12 series radio sets as installed in wheeled vehicles. DC power is traced from its source to each radio component of the AN/VRC-12 configurations, and to associated equipment.

The RT and R-442 receive signal paths are discussed, followed by RT keying and loudspeaker muting. Also covered are transmitted signal paths within the RT, and RT-246 servo tuning and remote RT-246 operation from Remote Box C-2742/VRC.

1-17. A-RT DC POWER INPUT AND DISTRIBUTION.



EL8NZ153

All eight AN/VRC-12 series radio sets have an A-RT. It is the radio component that receives its dc power through the mount connected directly to the vehicle's batteries. The A-RT requires an operating voltage of between 22 and 30 vdc. The dc power is applied from the batteries through Power Cable CX-4720 to Mount MT-1029. The mount then distributes dc power to the A-RT and other components of the radio set.

1-17. A-RT DC POWER INPUT AND DISTRIBUTION. (CONT)

(Refer to FO-1 (lower left corner).) Two 12-volt batteries, connected in series, apply positive 22 to 30 vdc through the WHITE/RED lead of the Power Cable CX-4720, to Pin B of P21. Since the negative side of the battery is grounded, ground is applied through the BLACK/GREEN lead of CX-4720 to Pin A of P21. P21 connects CX-4720 to Jack J21 of the mount.

IN THE MOUNT, Pin A of J21 is wired directly to Pins A of Jacks J22, J23 and J24, providing these pins with a path to ground. The positive 22 to 30 vdc is applied from Pin B of J21 through E21 on the terminal board and 100-amp Fuse F11 to E24 on the terminal board.

NOTE

E21 and F11 appear only in mounts produced before 1973. In mounts produced in 1973 and after, Pin B of J21 is wired directly to E24.

From E24, 22 to 30 vdc is applied directly to Pins B of Jacks J22, J23 and J24.

Before the A-RT can operate, the dc input power must be applied to Pin B and Pin J of J24. This can happen only if the metal LINK on TB-21 is set between Terminal Screws E23 and E24 (direct).

WHEN THE A-RT IS IN ITS MOUNT, P401 connects with J24. DC input power is applied to the RT in the following manner:

1. Pin B of J24 applies 22 to 30 vdc through Pin B of P401 to Contacts 4 and 5 of Power Control Relay K404.
2. Pin J of J24 applies 22 to 30 vdc through Pin J of P401 and Diode CR411 to Pin 7 of Power Control Relay K404.
3. Pin A of J24 provides a ground path to Pin A of P401, which then provides ground to the radio chassis.

CR411 is a reverse-polarity-protect diode. It prevents K404 from energizing (turning on) if the voltage polarity is reversed.

CAUTION

Source voltage polarity reversal is often caused by connecting the power cable leads to the wrong battery terminal. Reversed polarity will damage mount.

When the polarity is correct and the A-RT's POWER switch is set to OFF, the power input circuit is open. K404 is not energized. However, when the A-RT's POWER switch is set to LOW or HIGH, a path from K404 Pin 2 to ground is completed. The relay energizes and stays energized until the A-RT's POWER switch is set to OFF.

When the relay energizes, Contact 6 meets Contact 4, applying 22 to 30 vdc to two paths:

1. Through a 1-amp circuit breaker to Voltage Regulator Assembly A2100. When the RT's LIGHT switch is set to ON, dc power is applied to the dial lamp and the CALL lamp.
2. Through a 15-amp circuit breaker to the ANTENNA FREQ CONTROL circuit. (See para 1-19.)

1-17. A-RT DC POWER INPUT AND DISTRIBUTION. (CONT)

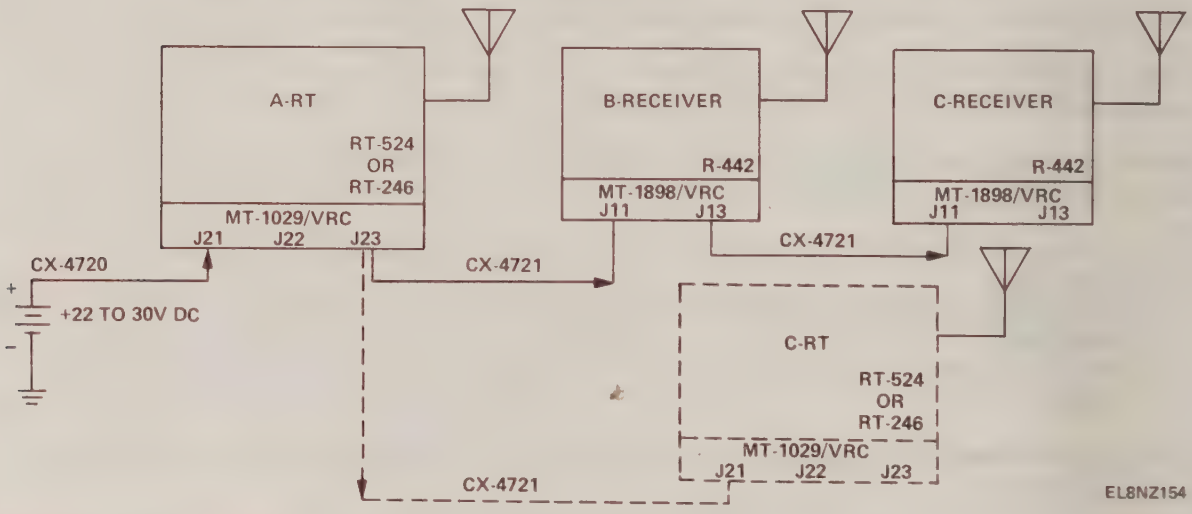
Additionally, energized relay Contact 3 meets Contact 5, sending 22 to 30 vdc through Pin C of P401 back into the mount. This voltage is applied to the mount at Pin C of J24 from which it is wired directly to Pin C of Jack J22, and Pin C of Jack J23.

J22 and J23 of the A-RT's mount provide a central distribution point for dc power to additional components of the radio set. Any components wired to Pin C of J22 or J23 can only be turned on when the A-RT is turned on. Components wired to Pin B receive dc power independent of the A-RT.

1-18. B-RECEIVER, C-RECEIVER AND C-RT POWER INPUT CIRCUIT.

NOTE

Refer to paragraph 1-11, for details covering various configurations.



In six of the AN/VRC-12 series radio set configurations, a B-Receiver (-12, -44, -47, and -48) or C-RT (-45 and -49) is connected to the A-RT's mount, using Power Distribution Cable CX-4721. In two of these configurations (-44 and -48), a C-Receiver is connected to the B-Receiver mount, using an additional CX-4721. In these six configurations, the A-RT's mount distributes dc power to the additional radio components. Power distribution to additional radio components can be DIRECT or REMOTE.

DIRECT

When an additional radio component's mount (consisting of a C- and/or B-receiver, or a C-RT) is set up for DIRECT operation, the additional radio component gets its power directly from the batteries. Therefore, the additional component operates whether or not the A-RT is in its mount.

REMOTE

Normally, the mounts for additional radio components are set up for REMOTE operation. In this mode, power comes from the A-RT, so it must be in its mount and turned on for additional radio components to operate.

1-18. B-RECEIVER, C-RECEIVER AND C-RT POWER INPUT CIRCUIT. (CONT)

Whether an additional radio component is set up for DIRECT or REMOTE operation, 22 to 30 vdc is applied from the A-RT's Mount MT-1029, through CX-4721 to B-Receiver Mount MT-1898, or C-RT Mount MT-1029. These mounts apply the voltage to their respective radio component. The B-Receiver mount applies 22 to 30 vdc to the C-Receiver, through the C-Receiver Mount MT-1898, and another CX-4721.

(Refer to FO-1.) DC input power is applied from J23 on the A-RT mount to P23 of Cable CX-4721. A ground path is provided to Pin A of P23 from Pin A of J23. Pin B of J23 applies 22 to 30 vdc to Pin B of P23. A-RT controlled Pin C of J23 also applies 22 to 30 volts to CX-4721 at Pin C of P23. In this case, the A-RT must be in its mount with its power on.

(Refer to FO-2 (lower left corner).) Connector P11 of CX-4721 applies dc input power to J11 of B-Receiver Mount MT-1898. The ground path is provided to Pin A of J11 from Pin A of P11. From Pin A of J11, a ground wire goes directly to Pins A of Jacks J12, J13 and J14. When the B-Receiver is in its mount, J14 connects to P201. Pin A of J14 provides a ground path to Pin A of P201, which then provides ground to the radio chassis.

REMOTE POWER INPUT

Assume that the B-Receiver's mount link is set between E12 and E13 (its REMOTE position), and that the A-RT is in its mount with power ON. The A-RT controlled 22 to 30 volts is applied from Pin C of P11 through Pin C of J11 to both E12 on the terminal board and Pin C of J13.The A-RT controlled 22 to 30 volts is applied from E12 through E13 and Pin C of J14 to Pin C of P201. Now inside the R-442, the input power is applied through reverse-polarity-protect Diode CR101 (see note in para 1-17), and Circuit Breaker CB101 (POWER switch) to Voltage Regulator Assembly A2100. When the R-442's LIGHT switch is set to ON, dc input power is applied to the dial lamp and CALL lamp.

DIRECT POWER INPUT

Now, assume that the B-Receiver's link is set between E13 and E14 (its DIRECT position). Pin B of P11 applies 22 to 30 vdc through Pin B of J11 and Fuse F11 to E14.

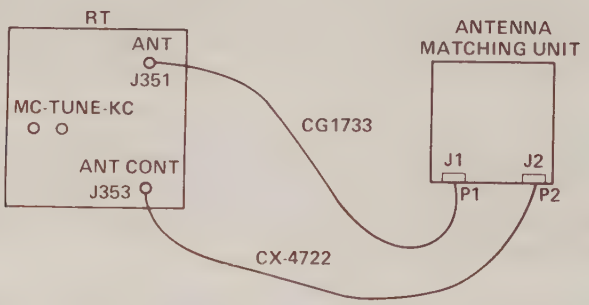
NOTE

F11 appears only in mounts produced before 1973. In mounts produced in 1973 and after, Pin B of J11 is wired directly to E14.

From E14, 22 to 30 vdc is applied through E13 to Pin C of J14. Pin C of J14 applies this input voltage to Pin C of P201 and power is supplied to the R-442 as described under Remote Power Input.

E14 also supplies 22 to 30 vdc to Pin B of J13, where it may be used to apply input power to a C-Receiver.

1-19. ANTENNA MATCHING UNIT, PURPOSE AND CONTROL.



EL8NZ202

The antenna matching unit contains ten tuning circuits. These circuits tune the antenna elements to the RT's operating frequency, to minimize reflected power. The operator uses the RT's tuning controls to select the operating frequency. Initially, the BAND switch applies voltage to certain pins in the antenna control jack. This voltage is then applied to the selecting mechanism in the matching unit to initially select the matching unit's tuned circuit. The MC control operates a cam switch, which also applies voltage to specific pins of the antenna control (ANT CONT) jack to position the selecting mechanism to a specific tuned circuit in the matching unit. The ANT CONT jack pins apply 22 to 30 vdc to specific conductors of Cable CX-4722. The cable applies this voltage to the antenna matching unit through Plug P2. For each frequency setting, certain pins in the plug have voltage applied while other pins must be at zero volts. The selecting mechanism in the antenna matching unit then connects the proper antenna tuning circuits to the antenna elements.

THE TRANSMITTED SIGNAL

When the RT is used as a transmitter, the rf output travels from the RT's antenna (ANT) jack through rf Cable CG-1773 and into the matching unit at Jack J1. The rf input at J1 passes through the matching unit to the antenna elements, which radiate the rf signals into space. When the antenna elements are properly tuned, rf signal radiation is at a maximum.

THE RECEIVED SIGNAL

When the RT is used as a receiver, the rf input travels in the opposite direction of the transmitted signal. The received signal travels from the antenna elements, through the matching unit, out J1, through Cable CG-1773, and into the RT at the antenna (ANT) jack.

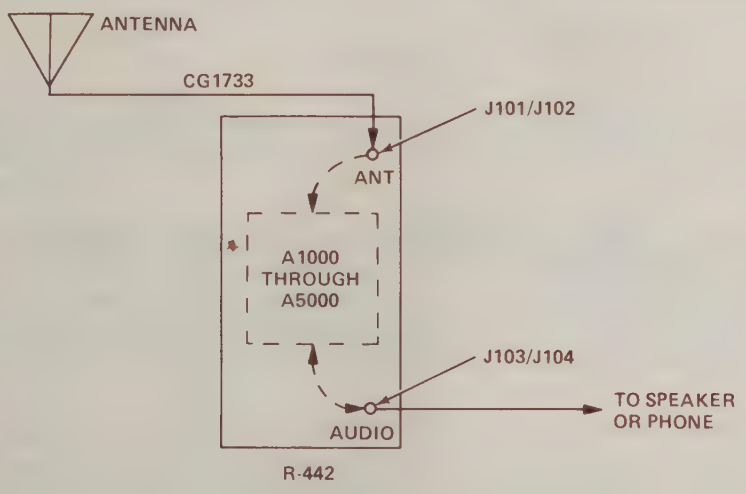
(Refer to FO-1 (box on right side).) In the matching unit, the rotary selector of S1 is electrically and mechanically connected to the switch section of S1. The rotary selector is also mechanically connected to the two switch sections that select the antenna tuning circuits. At Jack J2, Cable CX-4722 connects 22 to 30 vdc to the selector circuit. For an MX-6707, Pins M, L, K and B of J2 are not used. Pin C provides a path to ground and is connected to the matching unit's chassis. For an MX-6707, Pins N, A, D, E, F, H and J apply voltage to the matching unit circuitry.

The Antenna Matching Unit Control Voltage Chart (left side of FO-1) lists those pins which must have voltage applied to them and those which must have no voltage applied to them in order to select a particular antenna tuning circuit. For example, if the RT is tuned to 32 MHz, Pins N, A and D of J2 should have 22 to 30 vdc applied and Pins C, E, F, H and J should have zero volts applied.

1-19. ANTENNA MATCHING UNIT, PURPOSE AND CONTROL. (CONT)

When the voltages applied to the pins of J2 are changed, the rotary selector turns. The action of the rotary selector causes its switch section to turn. The two switch segments connecting the tuning circuit to the antenna elements also turn. Each segment turns one step at a time, until the proper tuned circuit is selected.

1-20. RECEIVER SIGNAL PATH.



EL8NZ200

The receiver signal path is the same in both the RT and the R-442. FM signals are intercepted by the antenna and pass through Cable CG-1773 into the radio component of the antenna (ANT) jack. Assemblies A1000 through A5000 make up the receiver's internal receive signal path. Here, a selected FM signal is processed and unwanted frequencies filtered out before the voice signal is recovered. The recovered voice signals are then sent through the AUDIO output jack to a loudspeaker or phone.

(Refer to FO-2.) The receiver's assemblies must have dc voltage applied to them in order to operate. When the POWER-ON-RESET switch is set to ON, 22 to 30 vdc is applied to Voltage Regulator Assembly A2100. (See para 1-17.) A2100 reduces the 22 to 30 vdc to 16 vdc and applies the reduced or regulated voltage directly to Assemblies A1000, A2000, A3000 and A4000. The manner in which this voltage is applied to the A5000 assembly is determined by the setting of the SQUELCH switch, which is covered later in this paragraph.

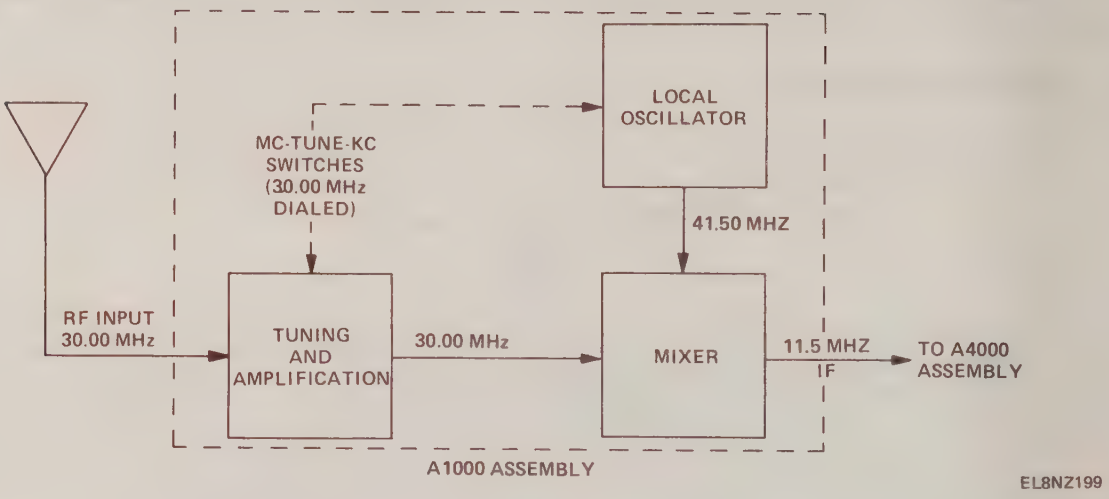
All AN/VRC-12 radio components are tunable in 50-kHz steps over the frequency range of 30.00 to 75.95 MHz. A total of 920 channels are available. The BAND switch and gear train connect all tunable components to the MC-TUNE-KC switches.

A1000 ASSEMBLY

In RCVR RF Assembly A1000, frequencies other than the selected frequency are rejected while the selected FM input is amplified. The FM input is then mixed with the output of a local oscillator to produce a constant 11.5-MHz intermediate frequency (if.). When the radio is in BAND A (30.00 to 52.95 MHz), the local oscillator generates a frequency which is 11.5 MHz above the dialed frequency. Refer to the following diagram.

1-20. RECEIVER SIGNAL PATH. (CONT)

A1000 ASSEMBLY (CONT)



When the receiver is tuned to 30 MHz, the tuning and amplification circuits will process only a 30.00-MHz rf input. The local oscillator generates 41.50 MHz. The mixer output is the difference between the local oscillator frequency and the rf input frequency (41.50 MHZ minus 30.00 MHz equals 11.5 MHz), the if.

When the radio is in BAND B, the local oscillator generates a frequency 11.5 MHz below the dialed frequency. Thus, a dialed frequency of 65.00 MHz will cause the local oscillator to generate 53.50 MHz (65.00 MHz minus 53.50 MHz equals 11.5 MHz).

CRYSTAL REFERENCE SYSTEM

(Refer to FO-2.) The local oscillator of RCVR Assembly A1000 is locked on frequency by an automatic frequency control (AFC) network, called the Crystal Reference System (CRS). If the local oscillator drifts even slightly from the correct frequency, the receiver's audio output will fade in and out. CRS Assembly A3000 compares the local oscillator output with a very stable, accurate frequency from the Oscillator Assembly A2000. The A2000's frequency is established by the dial setting.

When the local oscillator's frequency is offset from the dial frequency by exactly 11.5 MHz, no signal is sent from the A3000 back to the local oscillator. But if the local oscillator's frequency is wrong, the A3000 sends a dc error signal back to the oscillator, correcting its frequency.

A4000 ASSEMBLY

The frequency-modulated if. (11.5 MHz) is applied from the RCVR RF Assembly A1000 to if. Assembly A4000. Three things happen in this assembly:

1. The if. is amplified.
2. Carrier noise (static) is eliminated.
3. Message or audio signals are recovered from the if. signals.

1-20. RECEIVER SIGNAL PATH. (CONT)

X-MODE-NORMAL SWITCH

The A4000 assembly output signal passes through the X-MODE-NORMAL switch. When speech-securing equipment is used, the A4000's output is scrambled (coded) audio. Scrambled audio must be applied through the X-MODE switch (X-MODE position) to speech-decoding equipment. Without speech-securing equipment, normal audio signals are outputted from the A4000 and applied directly to the A5000.

NOTE

In the R-442, the X-MODE-NORMAL switch is always set to the NORMAL position when speech-securing equipment is not connected. Switch must be in X-MODE when speech-securing equipment is connected.

X-MODE Position: The X-MODE-NORMAL switch is set to the X-MODE position when speech-securing equipment is used. The signal exits the R-442 at P201, Pin E. Pin E of P201 passes the signal to Pin E of J14 on the mount. Pin E of J14 then passes the signal to Pin E (X-MODE OUT) of Jack J12. From there the signal is applied to a speech-decoding device whose output is applied back to Pin D of J12. Pin D connects to Pin L of R-442 Plug 201. From Pin L the signal is applied to A5000 for amplification.

NOTE

In X-MODE, the RT passes the signal through the X-MODE-NORMAL switch to Pin C of X-MODE Jack J354. (Refer to FO-1.)

NORMAL Position: When the X-MODE-NORMAL switch is set to the NORMAL position, the audio signal passes through the switch to Assembly A5000.

A5000 ASSEMBLY

The A5000 assembly consists of:

1. The af section.
2. Muting relay.
3. The squelch section.

The squelch section operates only when the SQUELCH switch is placed in NEW ON or OLD ON; therefore, the af section is covered first, followed by details of the squelch function.

Af Section

The af section of the A5000 assembly accepts low-level audio inputs from the A4000, and amplifies them to provide three audio outputs:

1. Monitor out.
2. Phone out.
3. Speaker out.

Monitor out is applied from the af section to Pin K of R-442 Plug P201, Pin K of J14 in the mount, and Pin K of J12 in the mount. The monitor out audio is fixed level (i.e., it is unaffected by the position of the volume control). This signal is used to provide audio input to additional equipment which requires fixed level audio input.

1-20. RECEIVER SIGNAL PATH. (CONT)

Af Section (Cont)

Phone out is applied from the af section to Pin B of R-442 Audio Jacks J103 and J104 and also to Plug P201 Pin S. From there it is applied to Pin S of J14 in the mount; then to Pin H of J12 in the mount. The phone out audio level is controlled by the R-442 VOLUME control. This signal is used to provide audio to other items of equipment.

Speaker out is applied from the af section, through Muting Relay K5001 to Pin E of Audio Jacks J103 and J104 and also to Plug P201 Pin F. From there it is applied to Pin F of J14 in the mount; then to Pin J of J12 in the mount. The speaker out audio level is like the phone out, controlled by the R-442 VOLUME control. This signal is used to provide audio to other items of equipment.

NOTE

For information covering the application of the three audio outputs to additional items of equipment (i.e. AN/VIC-1), refer to TM 11-5820-401-20-2.

Muting Relay

The function of the muting relay is covered in paragraph 1-22.

Squelch Section

The squelch section includes the following:

1. The SQUELCH switch.
2. The Squelch Section A5000.
3. The CALL lamp.

SQUELCH Switch. The SQUELCH switch manually turns the squelch function on and off. In both OFF positions, the af section receives 16-vdc operating power from the Squelch Section A5000 on a constant basis.

In the NEW ON position, 16 vdc is applied to the af section only when a 150-Hz signal is applied to the Squelch Section A5000.

In the OLD ON position, 16 vdc is applied to the af section only when the R-442 receives an rf signal (carrier).

Squelch Section A5000. The Squelch Section A5000 provides 16-vdc operating power to the AF Section A5000. The Squelch Section A5000 receives inputs from the A4000, but only recognizes them when the SQUELCH switch is set to OLD ON or NEW ON.

Connected to the Squelch Section A5000 through Pin F of J12 on the mount, is the SQUELCH DISABLE OUT. When speech-securing equipment is used, this circuit remotely controls the squelch function, causing the Squelch Section A5000 to output 16 vdc to the af section.

1-20. RECEIVER SIGNAL PATH. (CONT)

CALL Lamp. The CALL lamp provides a visual indication of a received signal, and comes on only in the SQUELCH switch NEW ON or OLD ON positions when:

1. A 150-Hz signal is applied to the Squelch Section A5000 in NEW ON operation.

2. An rf signal is received in OLD ON operation.

The CALL lamp comes on when a ground path is provided within the Squelch Section A5000, which occurs in conditions 1 and 2 above.

DIFFERENCES IN RECEIVE SIGNAL PATH/RT's AND R-442

Although most circuits in the receive signal path are the same in the RT's and the R-442, there is a major difference in the RT's X-mode signal path.

R-442 X-Mode

(Refer to FO-2.) Audio signals are applied to the X-mode pin of the A4000 NORMAL/X-MODE switch. and then to Pin E of Plug P201. From P201, audio signals are applied to J14 and J12 in the mount. Therefore, in the X-mode, no audio is applied to the A5000 for amplification.

RT X-Mode

(Refer to FO-1.) Audio signals are applied to the X-mode pin of the A4000 NORMAL/X-MODE switch, and then to Pin A at the X-mode jack on the front panel, instead of at the mount as in the case of the R-442.

From Pin A, the audio signals are applied to Pin C through the installed X-mode plug. From Pin C the signals are applied to the af section of the A5000 for amplification. Included with the audio signals are the 150-Hz NEW SQUELCH signals, which are applied to the K401 keying relay, and to the squelch section of the A5000.

In the RT's, when the A4000 NORMAL/X-MODE switch is in the X-MODE position and the X-mode plug is installed, the effect is as though the X-MODE switch were in the NORMAL position.

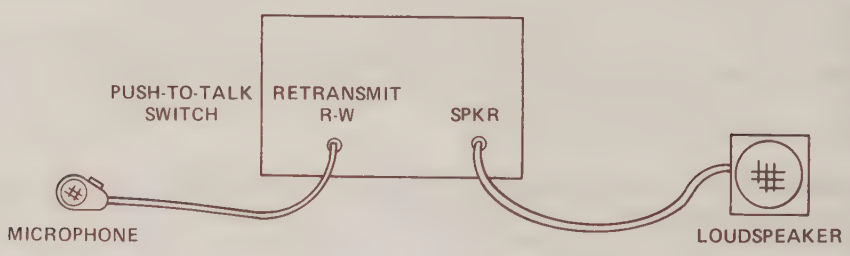
INTERNAL SPEAKER/RT-524

(Refer to FO-1.) Amplified SPEAKER audio signals are applied to the K5001 muting relay from the af section of the A5000. From the relay, the signals pass through the closed SPEAKER switch to the internal loudspeaker.

ATTENUATED PHONE AUDIO/RETRANSMIT R/W JACK-RT'S ONLY

(Refer to FO-1.) PHONE audio signals are available at Pin B of the RT's front panel RETRANSMIT R/W jack and at Pin B of the SPKR jack. However, the signal at the RETRANSMIT R/W jack is attenuated (lower voltage) to prevent overdriving certain external equipment that can be connected to the jack.

1-21. RT KEYING AND LOUDSPEAKER MUTING CIRCUIT.



EL8NZ198

Keying turns the RT's transmitter on and its receiver off. When its power is first turned on, the RT functions as a receiver. For the RT to function as a transmitter, the operator must press in the push-to-talk (key) switch on the microphone. The microphone is normally connected to the RT at the RETRANSMIT RW jack.

NOTE

Keying may also be accomplished from a REMOTE location in a vehicle by extending the keying circuit to an auxiliary component. An example is Relay Box C-2299, which is covered in paragraph 1-24.

When the operator keys the microphone (transmits), the following occurs:

1. The blower runs.
2. RF is produced.
3. The CALL lamp is off.
4. The audio reproducers are quiet (except for possibly a 150-Hz tone).

When the operator unkeys the microphone, the radio functions as a receiver. The transmitter no longer produces rf, and the blower stops running, unless the RT is overheated. A thermostat in the RT will cause the blower motor to stop when the RT reaches a safe temperature.

(Refer to FO-1.) The RT switches from receiver to transmitter and back again through the actions of several relays. The radio's power must be on for them to operate.

KEYING CIRCUIT

Relays K401 and K405 are energized by keying the microphone, which provides them with a path to ground. When energized, K405 prevents the RT's CALL lamp from lighting. The energized K401 performs two functions:

1. It passes the 150-Hz squelch tone to the transmitter's modulator, except when the SQUELCH switch is set to OLD ON.
2. It energizes K402 and K403 by providing them with operating voltage.

1-21. RT KEYING AND LOUDSPEAKER MUTING CIRCUIT. (CONT)

The energized K403 supplies operating voltage to the RT's transmitter assemblies, and K402 mutes the speaker by providing a ground path for associated muting circuitry.

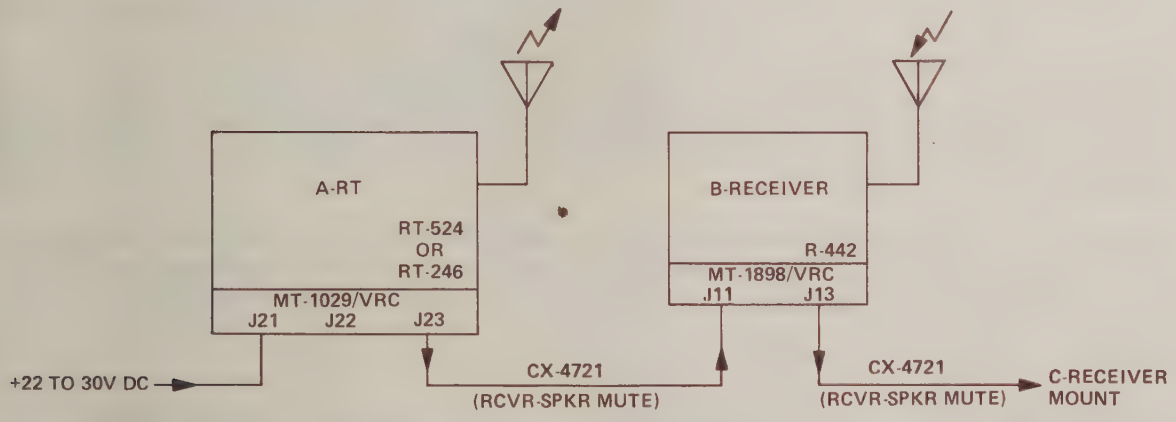
Keying also turns on Power Supply Assembly A9000. A9000 provides -14 to -21 vdc, +275 vdc and 700 vdc to the A6000 assembly and 115 vdc to operate the blower.

When Keying Relay K401 energizes during transmit operation, it supplies dc operating voltage to Antenna Coax Relay K301. The K301 relay energizes, grounding the receive signal path and connecting the transmitter's rf output to the RT antenna jack.

RT LOUDSPEAKER MUTING CIRCUIT

When energized, K402 provides a ground for K5001. K5001 then energizes, muting the RT's speaker. This muting ground is also applied from K402 to Pin D of P401. Pin D of P401 connects to Pin D of J24 on the mount. Pin D of J24 connects to Pin D (RCVR SPKR MUTE) of J23 through CR21. This connection provides muting ground for all auxiliary receivers (see para 1-22). Diode CR21 prevents feedback from the auxiliary receivers which would mute the RT.

1-22. AUXILIARY RECEIVER LOUDSPEAKER MUTING CIRCUIT.



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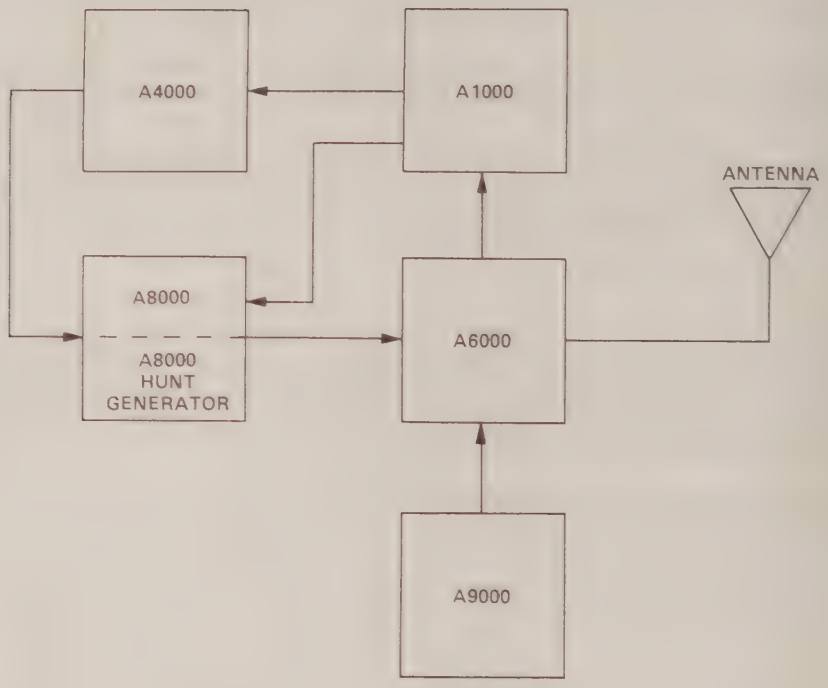
The A-RT provides muting ground through J23 of its mount, Cable CX-4721, and J11 of the B-Receiver's mount, into the B-Receiver. When the radio set includes a C-Receiver, the muting ground is extended from J13 of the B-Receiver's mount to J11 of the C-Receiver's mount, and on to the C-Receiver. To provide muting ground, the A-RT must be keyed. (See para 1-21.)

(Refer to FO-2 (lower left corner).) Muting ground is provided to Jack J11 of the B-Receiver's mount by P11 of Cable CX-4721. Pin D of P11 applies muting ground through Pin D of J11 to Pins D of J13 (RCVR SPKR MUTE OUT) and J14 (RCVR SPKR MUTE IN). Pin D of J14 provides muting ground to Pin D of P201, which applies it to the R-442's Muting Relay K5001. K5001 mutes the R-442's speaker when it is energized.

Pin D of J13 extends the ground to J11 of the C-Receiver, which is muted the same way as the B-Receiver.

1-23. RF GENERATION IN RT, AFC, AND VOICE/150-HZ MODULATION/SIDETONE CIRCUIT.



EL8NZ197

RF GENERATION

When the RT's mike is keyed, the A6000 assembly produces an rf signal whose frequency should be indentical to the one dialed on the MC-TUNE-KC controls. This rf signal exits the RT through the antenna. The operating voltage for the A6000 assembly is supplied by the A9000 assembly.

AUTOMATIC FREQUENCY CONTROL (AFC) CIRCUITS

The rf signal exiting the antenna must be exactly at the frequency selected by the MC-TUNE-KC controls. If the rf signal is more than ± 4 kHz from the selected frequency, problems in transmission will result. To maintain correct transmission frequency, an automatic frequency control (AFC) system is used. This system senses any error in transmitted frequency and automatically corrects it.

Correction of the transmitted frequency is done in two ways. For small errors in frequency, fine tuning is accomplished by AFC 2. Larger errors (± 20 kHz) are corrected by AFC 1. AFC 1 normally works only when the transmitter is initially keyed.

AFC 1

(Refer to FO-1.) A sample of the A6000's rf signal is applied to the A1000 to check its accuracy. If the rf signal is more than ± 20 kHz from the MC-TUNE-KC setting, the A1000 applies a signal to the A4000 which the A4000 rejects by a filtering process. When the A4000 rejects this input, it turns off a control signal which is normally applied to the A8000. The absence of this control signal (AFC 1) causes the A8000 to output a very strong coarse tune signal, applied to A6000 to correct its frequency.

1-23. RF GENERATION IN RT, AFC, AND VOICE/150-HZ MODULATION/SIDETONE CIRCUIT. (CONT)

AFC 2

(Refer to FO-1.) A sample of the A6000's rf signal is applied to the A1000 to check its accuracy. The A1000 mixes this signal with a precise, fixed frequency signal, generated within the A1000, to produce an if. signal which approximately equals 11.5 MHz. If the transmitted rf signal is not exactly on frequency, the 11.5 MHz signal will be off by the same amount. This if. signal is applied to the A8000. Within the A8000, the signal approximately equalling 11.5 MHz is compared to another fixed signal generated within the A8000 which exactly equals 11.5 MHz. The difference in the two signals causes the A8000 to output a relatively weak, fine tune signal, applied to the A6000 to correct its frequency.

Turning Off AFC 1

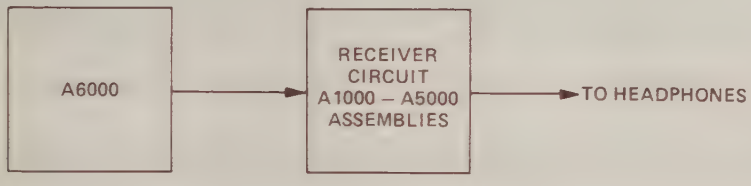
AFC 1 is turned off when the transmitted rf signal is within 20 kHz of the MC-TUNE-KC setting. With AFC 1 turned off, AFC 2 takes over, keeping the transmitted frequency accurate to ± 4 kHz.

VOICE CIRCUIT

(Refer to FO-1.) Voice signals from the keyed microphone pass from Pin D of one of the MIKE jacks to Modulation Assembly A8000.

From here, the voice signal is applied to Pin G of the X-mode Jack J354. The X-mode plug jumps the signal from Pin G to Pin E of the X-mode jack. Pin E of the X-mode jack returns the voice signal to the A5000 assembly where it is amplified. The A8000 assembly applies the voice signal to the XMIT RF A6000 assembly and modulates the rf output. The voice-modulated signal is then sent through the antenna.

SIDETONE CIRCUIT



EL8NZ196

The RT's sidetone circuit allows the user to hear himself through his headphones. A sample of the A6000's voice-modulated rf output is sent through the receive path, (i.e., the A1000 through A5000 assemblies process the rf output as though it were a received signal, to produce an audio in the headphones). There is a weak voice sidetone from the speaker because it is muted.

1-23. RF GENERATION IN RT, AFC, AND VOICE/150-HZ MODULATION/SIDETONE CIRCUIT. (CONT)

150-HZ MODULATION CIRCUIT

The discussion of the RT's SQUELCH switch in paragraph 1-20 explained why a 150-Hz tone must modulate the transmitter's output signal if the distant receiver's SQUELCH switch is set to NEW ON. To modulate the signal with a 150-Hz tone, the transmitting RT's SQUELCH switch must be set to OLD OFF, NEW OFF or NEW ON.

(Refer to FO-1.) When the RT is keyed, Relay K401 energizes. K401, Contact 2, meets Contact 5. This relay action and the position of the SQUELCH switch (in any position but OLD ON) causes Squelch Assembly A5000 to generate a 150-Hz tone. The 150-Hz tone passes through to contacts of the RT's SQUELCH switch to modulation assembly A8000. Here, the 150-Hz tone circuit splits into two paths:

1. A feedback path from the A8000 assembly through Pin J of the X-mode jack. A jumper on the X-mode plug connects Pin J to Pin D of the X-mode jack. Pin D then passes the 150-Hz tone back through K401 to Squelch Assembly A5000. The feedback helps the Squelch Assembly A5000 to generate the continuous 150-Hz tone.
2. The other 150-Hz path passes the tone to Modulation Assembly A8000. Here, the 150-Hz tone is amplified and passed to XMIT RF Assembly A6000. The 150-Hz tone modulates the rf signal, which then exits the RT to the antenna.

1-24. AUDIO ACCESSORY EXTENSION USING CONTROL BOX C-2299.

Control Box C-2299 provides radio relay operations for the AN/VRC-45 and AN/VRC-49 configurations. It is also used to extend the RT audio accessory functions for the other six AN/VRC-12 series configurations.

AUDIO ACCESSORY EXTENSION

(Refer to FO-3.) With its RETRANS switch in the OFF position, the C-2299 allows the user to operate up to two RT's from a remote location. The user can receive or transmit from one RT at a time by placing the C-2299 RAD TRANS switch in position 1 or position 2. Only mike keying and audio reception can be remotely controlled. All other functions (except retrans) must be controlled directly at the RT. Control of transmission and reception are described below.

Transmission

When the user keys the microphone and talks, the C-2299 does the following:

1. Provides circuit for keying signal (MIC SW) passage from microphone to RT.
2. Provides circuit for audio signal (AF FROM MIC) passage from microphone to RT A8000 assembly to modulate transmitted rf.

The MIC SW signal applies a ground to either the A-RT or C-RT to key the transmitter. Ground is applied from Terminal A of C-2299 at J703 or J704 through the microphone, to Terminal C. From Terminal C, ground is applied to a segment of the RAD TRANS switch. The RAD TRANS switch, in turn, selects one of two circuits (depending on the RT selected), from which the ground is applied to a corresponding segment in the RETRANS switch.

1-24. AUDIO ACCESSORY EXTENSION USING CONTROL BOX C-2299. (CONT)

Ground is then applied to Pin S of J701 in the C-2299; to Pin S of J22 in the MT-1029; Pin H of P401 in the RT; and then to Pin C within the RT. The ground energizes the K405 retransmit relay and the K401 keying relay, thereby putting the RT into the transmit mode. If the RAD TRANS switch is set to position 1, the A-RT goes into the transmit mode, while the C-RT's received audio outputs are open-circuited at the C-2299 RAD TRANS and RETRANS switches, thus rendering the C-RT effectively inoperative. In position 2 of the RAD TRANS switch, the C-RT transmits while the A-RT's audio outputs are open-circuited.

Microphone voice signals (AF FROM MIC) are applied to Pin D of J703 or J704 in the C-2299. These signals are then applied to the INPUT pin at the A80 MIC AMPL, where they are amplified. Amplified voice signals exit the A80 at the OUTPUT pin and are applied to a segment of the RAD TRANS switch. In position 1 of the RAD TRANS switch, the voice signals are applied to Pin U of J701, or Pin U of J702 in position 2.

From Pin U, the signals go to Pin U at J22 of MT-1029; to Pin N of RT Plug P401; and to Pin D within the RT. The voice signals are finally applied to the A8000 assembly speech amplifier for eventual frequency-modulation of the master oscillator's rf output.

Reception

In position 1 of the RAD TRANS switch, SPEAKER audio signals from the A-RT are selected, while the C-RT's SPEAKER audio signals are open-circuited at the switch segment. The reception path is as follows.

SPEAKER audio from the A5000 is applied to Pin F of RT Plug P401. From there, the received SPEAKER signals (MUTED AUDIO) are applied to Pin J at J22 in the mount; to Pin J of C-2299 J701 (or J702); to the RAD TRANS switch; the VOLUME control; and then to Pin B and Pin E of J703 and J704. Pin B or Pin E applies the audio to the user's headphone, or to a speaker.

AUDIO ACCESSORY EXTENSION USING A SINGLE RT

When only one RT is used, it must be plugged into the C-2299 J701 jack. If the J702 jack is used, no dc power is applied to the A80 MIC AMPL, in which case there will not be sufficient microphone signal amplitude to drive the transmitter's speech amplifier and, thus, the user's voice will not transmit.

1-25. RADIO RELAY OPERATION (RETRANSMISSION) USING CONTROL BOX C-2299.

Control Box C-2299 provides radio relay operations for the AN/VRC-45 and AN/VRC-49 configurations. During radio relay operation, the user can hear the messages being relayed, but he cannot otherwise control the audio accessories.

The A- and C-RT's go into the relay operation mode when the C-2299 RETRANS switch is in the ON position and the RT's are both set to NEW or OLD SQUELCH. At this time, both RT's receive incoming signals. One RT breaks squelch before the other and becomes the relay receiver, making the other RT the relay transmitter. Assuming the A-RT breaks squelch first, the relay process is as follows.

1-25. RADIO RELAY OPERATION (RETRANSMISSION) USING CONTROL BOX C-2299. (CONT)

RETRANSMIT C-RT KEYING

The retransmit signal is sent from the A-RT (receiver) to the C-RT (transmitter) as a keying signal to put the C-RT into the transmit mode. The retransmit signal is a ground provided by the A-RT when it breaks squelch.

When the received FM signals cause the A-RT to break squelch, its K5002 SQUELCH relay energizes, connecting Contacts 2 and 5. Since Contact 2 is at ground potential, ground is applied through Contacts 2 and 4 of RETRANSMIT Relay K405 to Pin T of P401, Pin T of J24, Pin T of J22, and then through Pin T of J701 in the C-2299 control box. From there the ground is applied to a segment of the RETRANS switch (ON), from which it is applied to Pin J of J702. Ground is then applied through CX-4723 to Pin S of J22 in the C-RT's mount; Pin H of J24 of P401; and then to Keying Relay K401, thus keying the transmitter.

With the C-RT keyed, it can transmit messages received by the A-RT. The modulation path from the A-RT to the C-RT is as follows.

RETRANSMIT C-RT MODULATION

In the A-RT (receiving), three audio outputs are available at the A5000 assembly. One of them, FIXED LEVEL AUDIO (monitor audio), is applied to Pin K of P401 to Pin K of J24, to Pin K of J22; through CX-4723 to Pin K of J701 at the C-2299; and to a segment of the RETRANS switch. From the RETRANS switch, the audio signals are applied to Pin U of J702; through CX-4723; Pin U of J22 on the mount, to Pin N of J24; Pin N of C-RT P401; and then to the A8000 assembly speech amplifier for frequency-modulation of the master oscillator's rf output.

If the C-RT receives a signal, the A-RT transmits it.

RETRANSMIT A-RT KEYING PATH

The signal received by the C-RT establishes an A-RT keying ground at its P401 as previously described for the Retransmit C-RT Keying paragraph above. C-RT's P401 Pin T mates with mount J24 Pin T which applies the ground to Pin T of J22, and then through CX-4723 to Pin T of J702 in the C-2299 control box. From there the ground is applied to a segment of the RETRANS switch (ON), from which it is applied to Pin S of J701. Ground is then applied through CX-4723 to Pin S of J22 in the A-RT's mount; to Pin H of J24 to Pin H of P401; and then to keying relay K401, thus keying the transmitter.

With the A-RT keyed, it can transmit messages received by the C-RT. The modulation path from the C-RT to the A-RT is as follows.

RETRANSMIT A-RT MODULATION

In the C-RT (receiving), three audio outputs are available at the A5000 assembly. One of them, FIXED LEVEL AUDIO (monitor audio), is applied to Pin K of P401, to Pin K of J24, to Pin K of J22; through CX-4723 to Pin K of J702 at the C-2299; and to a segment of the RETRANS switch. From the RETRANS switch, the audio signals are applied to Pin U of J701; through CX-4723 to Pin U of J22 on the mount, to Pin N of J24; Pin N of A-RT P401; and then to A8000 assembly speech amplifier for frequency modulation of the master oscillator's rf output.

1-25. RADIO RELAY OPERATION (RETRANSMISSION) USING CONTROL BOX C-2299. (CONT)

RETRANSMIT RT MONITORING

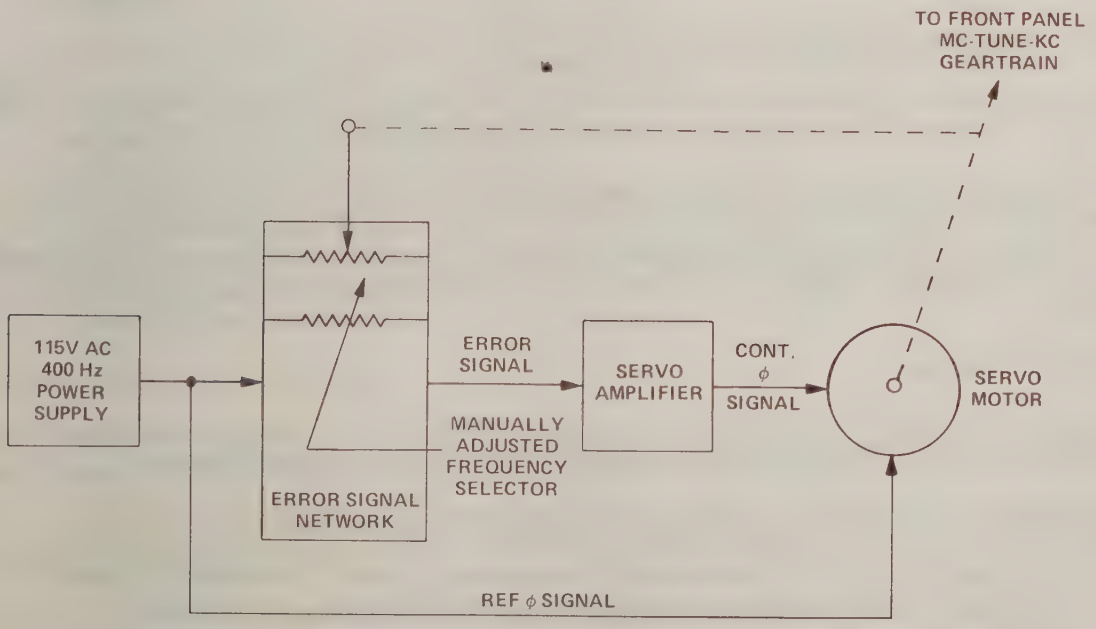
If the A-RT is the receiving RT during relay operation, the RAD TRANS switch on the C-2299 must be in position 1 for the user to hear the relayed message. Of course, position 2 must be selected if the C-RT is the receiving unit. Assuming the A-RT is the receiving unit, the audio path to the user's accessory is as follows.

SPEAKER audio from the A-RT's A5000 assembly is applied to Pin F of RT P401; Pin F of J24 to Pin J of J22 in the mount; through CX-4723 to Pin J of J701; and to a segment of the RAD TRANS switch. From the RAD TRANS switch, the audio signals are applied through the VOLUME control to Pin B and Pin E of J703 and J704. These signals are then used to drive an audio accessory enabling the user to monitor the received messages.

If the C-RT is the receiving RT during relay operation, the SPEAKER audio from the C-RT's A5000 assembly is applied to Pin F of P401; Pin F of J24 to Pin J of J22 in the mount; through CX-4723 to Pin J of J702; and to a segment of the RAD TRANS switch. From the RAD TRANS switch, the audio signals are applied through the VOLUME control to Pin B and Pin E of J703 and J704. These signals are then used to drive an audio accessory enabling the user to monitor the received messages.

1-26. RT-246(*)/VRC SERVOSYSTEM.

BASIC SERVO OPERATION



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1-26. RT-246(*)/VRC SERVOSYSTEM. (CONT)

The purpose of a basic servosystem is the automatic tuning of a radio to a preset frequency when a channel pushbutton is pressed. Automatic tuning is done by the action of a servomotor on the radio's gear train.

A manually adjusted frequency selector sets the particular frequency to which a pushbutton is preset. The frequency selector is part of the error signal network, which also includes a potentiometer whose moveable wiper is connected to the servomotor through a mechanical linkage.

AC power is applied to the error signal network, which outputs on error signal when the manually adjusted frequency selector and the potentiometer are not electrically balanced. Electrical imbalance exists whenever a channel pushbutton is pressed and the radio is not tuned to the preset frequency. In other words, the potentiometer's moveable wiper is in the wrong position.

This imbalance causes the error signal to be applied to the servoamplifier, which amplifies it, and outputs a control phase ( ) signal to the servomotor. The action of the control phase ( ) signal and the reference phase ( ) signal from ac power source causes the servomotor to turn.

As the motor turns, it moves the gear train, tuning the radio to the proper frequency. The motor also moves the potentiometer's moveable wiper until the error signal network electrically balances. At this point, the error signal and control phase ( ) signals disappear, and the servomotor stops turning, causing the gear train to stop moving at the preselected frequency setting.

DETAILED OPERATION OF RT-246(*)/VRC SERVOSYSTEM

(Refer to FO-4.)

Power Flow To Pushbutton Assembly

Terminals J and B on Plug P401 receive 22 to 30 vdc input. This voltage is applied to Power Relay K404 at Terminal 7 and then to ground through the POWER switch when it is in LOW or HIGH position.

With K404 Terminal 2 at ground potential, the relay energizes, causing Terminals 4 and 6 to contact. DC power is now applied from Terminal B of P401 to Terminals 4 and 6 of K404; through the one-amp circuit breaker to the POWER switch. Power is then applied to the BAND switch when the POWER switch is in LOW or HIGH position. When the BAND switch is in AUTO, it applies power to the pushbutton assembly.

NULL Switch Operation

The NULL switch turns the servosystem on by supplying 25.5 vdc to the 115-vac power supply and to the servoamplifier. Fo the NULL switch to supply 25.5 vdc, it must receive enable signals.

When pushbutton 1 is pressed, for example, power is applied to a time delay device which, for a limited period of time, applies an enable voltage to the NULL switch, temporarily turning it on. The NULL switch would turn off shortly after enable 1 disappeared, if it did not receive another enable signal. The source of the additional enable signal will be discussed later in this paragraph.

1-26. RT-246(*)/VRC SERVOSYSTEM. (CONT)

Error Signal Generation

For the servomotor to operate and automatically tune the radio component, an error signal must be produced. The RT-246(*)/VRC's servosystem error signal is produced by the error signal network as described under Basic Servo Operation.

Part of the ac error signal is applied back to the NULL switch through a stepdown transformer. It is then rectified and applied to the NULL switch as dc enable 2. As long as the servosystem is in the process of automatically tuning, an error signal is produced and with it, an enable 2 signal. When the system is properly tuned, the error signal network balances; the error signal disappears along with enable 2, and the NULL switch shuts off the system by turning off the 25.5-vdc power to the servoamplifier and 115-vac, 400-Hz power supply.

Operation of Servoamplifier and Servomotor

The servoamplifier and servomotor function as described under Basic Servo Operation. As indicated in FO-x, the servoamplifier is turned on only when it receives 25.5 vdc from the NULL switch.

TUNE Button

The TUNE button independently turns on the NULL switch when the button is pressed to allow manual presetting.

1-27. RT-246(*)/VRC POWER CONTROL AND CHANNEL SELECTION FROM PRIMARY AND TANDEM C-2742/VRC.

Control Box C-2742 can be used to control the following functions of the RT-246 from a remote location:

1. Main 22-30 vdc power ON/OFF switching.
2. Selection of high or low rf power transmission.
3. Selection of any one of ten preset channels established by the RT's channel pushbuttons.

An additional C-2742 can be connected to a primary C-2742 for tandem operation, thereby permitting the tandem C-2742 to perform the same functions as the primary unit except for power ON/OFF switching, from a second remote location.

MAIN POWER ON/OFF SWITCHING

(Refer to FO-4.) With the primary C-2742 PWR Switch S72 in the OFF position, Contact 3 is opened (ungrounded). This opens the ground path for the RT's K404 power relay, turning the RT off.

Contact 3 is grounded in both the HI and LO positions of the PWR switch. In either case, the RT's power relay ground circuit is as follows.

DC power is applied to Pin J at Plug P401 of the RT; Contacts 7 and 2 of Power Relay K404; through a segment of the RT's POWER switch in the REMOTE position; and to Pin N of the RT's REMOTE Jack J306. From Pin N, power is applied to Pin N of J71 at the C-2742, and from J71 to Contact 3 at the PWR switch. When Contact 3 is grounded, the RT turns on.

1-27. RT-246(*)/VRC POWER CONTROL AND CHANNEL SELECTION FROM PRIMARY AND TANDEM C-2742/VRC. (CONT)

SELECTION OF HIGH OR LOW RF POWER

For the RT to operate in the low-power mode, its LO-HI Power Relay K406 must be deenergized; (i.e., it must have no path to ground). When the C-2742 PWR switch is set to LO, Contact 4 of the PWR switch is left open, keeping K406 deenergized.

In the high-power mode, the K406 ground path is as follows. DC power is applied to K406 at Contact 7; through the relay coil to Contact 3; to a segment of the RT POWER switch; and to Pin P at the RT REMOTE Jack J306. From the REMOTE jack, power is applied to Pin P at C-2742 J71; to Contact 5 of K71.

The C-2742 takes control of the RT when the S73 SW (switch) is toggled, also causing K71 Contact 5 to mate with Contact 3. Power from the RT LO-HI Power Relay K406 is applied to Contact 3 of K71, to Contact 4 of the PWR switch, and to ground through to switch segment. This energizes RT Relay K406, causing the RT to operate in the high-power mode.

REMOTE SELECTION OF PRESET CHANNELS

The C-2742 CHAN SEL switch applies dc power to the RT channel pushbutton assembly to select individual channels. The CHAN SEL switch receives dc power from the K71 relay. Operation of the K71 relay is as follows.

K71 Relay

DC power from Pin B of RT Plug P401 is applied to the one-amp circuit breaker through Contacts 4 and 6 of the Power Relay K404. From the breaker, power is applied to a segment of the POWER switch; and then to Pin M of the RT's REMOTE jack. From the remote jack, power is applied to Pin M at J71 in the C-2742, and then to Coil Contacts 7 and 10 at Relay K71. The relay is energized by the action of Momentary Contact Switch (SW) S73.

Momentary Switch (SW) S73

When Momentary Switch S73 is closed, it provides a ground path for Contact 10 of Relay K71. With Contact 10 grounded, 22-30 vdc through the relay coil to ground energizes the relay. When this happens, K71 relay Contacts 6 and 8 mate, thereby supplying dc power to the CONTROL lamp and the S71 CHAN SEL switch.

Control Lamp

The CONTROL lamp illuminates when the K71 relay coil 7-10 is energized, indicating to the user that power is available at the CHAN SEL switch, enabling the switch to select one of the RT's preset channels.

Chan Sel Switch

The CHAN SEL switch applies dc power to Pin B, C, D, E, F, H, J, K, or L at C-2742's J71 and to identical pins at RT REMOTE Jack J306. Only one circuit at a time is energized by the CHAN SEL switch; each pin corresponds to an individual channel.

1-27. RT-246(*)/VRC POWER CONTROL AND CHANNEL SELECTION FROM PRIMARY AND TANDEM C-2742/VRC. (CONT)

The dc power applied to the pins at the REMOTE jack is then applied to the selected channel pushbutton circuit in the RT servosystem, turning on the system to automatically tune the RT to the preset frequency.

TANDEM OPERATION

NOTE

The primary C-2742 PWR switch must be at LO or HI for the tandem C-2742 to operate.

When the momentary switch is closed at the tandem C-2742, it takes control of the RT using circuits identical to those described in connection with the primary unit.

However, when the tandem unit takes control, the primary C-2742 can no longer select channels using its CHAN SEL switch, until its momentary switch is once again closed. This happens because the primary C-2742's K71 relay energizes coil 2-9 in the reverse direction when the tandem unit's S73 switch is closed. The dc path is as follows.

DC power available at Pin M of J71 at the primary C-2742 is applied through Contacts 2 to 9 of the K71 relay coil. From Contact 9, power is applied to Pin U of J72; to Pin U of J71 at the tandem C-2742; and then to ground through the tandem unit's closed Momentary Switch S73.

The ground at Switch S73 energizes K71 relay coil 7-10 1 to the tandem C-2742 and K71 relay coil 2-9 in the primary C-2742, causing it to move in a direction opposite to that which it moved when the primary unit's momentary switch was closed. This movement disconnects the primary C-2742's K71 Contacts 6 and 8; thus removing dc power from the CHAN SEL switch. Therefore, the primary C-2742 cannot make channel selections while the tandem unit is in control. Furthermore, since Contacts 3 and 5 of the K71 relay also become disconnected, the primary PWR switch cannot control the RT power level. The tandem unit then assumes channel selection and power level control as described for the primary C-2742.

CHAPTER 2

INSTALLATION

Subject	Section	Page
Installation Tools and Materials	I	2-1
Service Upon Receipt	II	2-2
Installation Procedures	III	2-3

OVERVIEW

This chapter contains information concerning tools, materials and procedures needed for installation of components of the AN/VRC-12 series radio sets and the cabling of these components. This chapter also provides information on unpacking and checking of equipment upon receipt and procedures to verify correct installation.

Section I INSTALLATION TOOLS AND MATERIALS

Subject	Para	Page
Common Tools and Equipment	2-1	2-1
Special Installation Tools and Materials	2-2	2-1

2-1. COMMON TOOLS AND EQUIPMENT.

Authorized common tools and equipment are listed in either your unit's Modified Table of Organization and Equipment (MTOE) or Table of Distribution and Allowances (TDA), whichever is applicable to your unit.

2-2. SPECIAL INSTALLATION TOOLS AND MATERIALS.

Special tools for installation are listed in appendix B. Expendable materials are listed in appendix C.

Most tools required for all installation procedures are contained in Tool Kit, Electronic Equipment TK-101/G. When specific tools not contained in TK-101 are needed, they will be listed at the beginning of the specific installation procedure.

NOTE

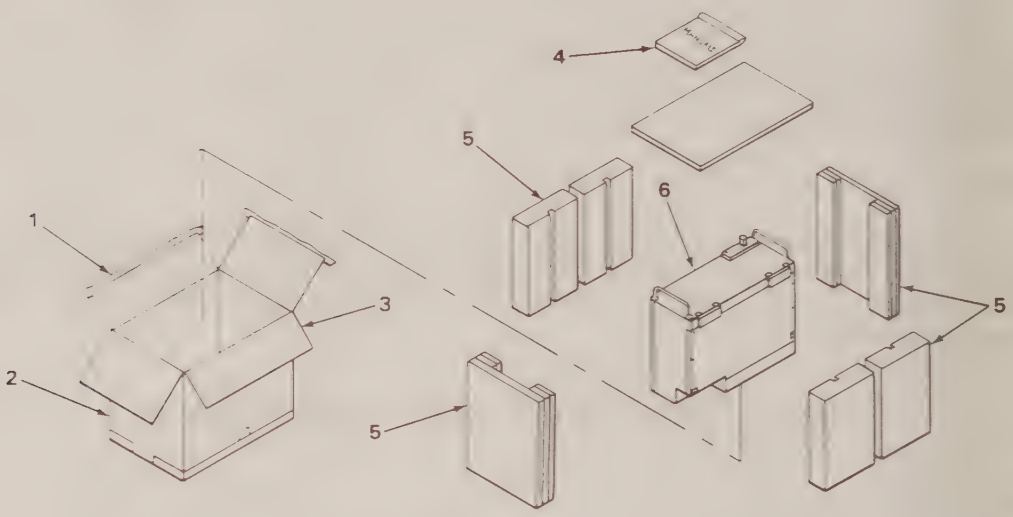
Special tools needed and not contained in TK-101 (e.g., an electric drill, drill bits, metal punches, etc) normally can be obtained from your motor maintenance section.

If additional parts or hardware are needed for a particular installation, refer to the appropriate TM 11-2300 series installation manual. This technical manual lists the National Stock Numbers (NSN) and/or part numbers for all the parts required for the particular vehicle's installation.

Section II SERVICE UPON RECEIPT

2-3. UNPACKING AND INSPECTING UNPACKED RADIO SET ITEMS.

TOOLS: Tool Kit TK-101/G



CAUTION

The radio set items of equipment are compact and heavy (over 60 lb). Be very careful when handling them. Serious personnel injury could occur. Observe proper handling procedures (paragraph 2-11).

NOTE

If unit is packed in a wooden crate, remove wooden crate.

When cutting cardboard with knife. do not allow knife to enter carton. Save all packing material for use in repacking radio set items.

1. Using knife, cut tape (1) on box (2).
2. Open flaps (3) and fold back.
3. Remove manuals (4).
4. Remove fiberboard pads (5).
5. Lift out radio set component (6) (RT illustrated).

Inspect the radio set for damage sustained during shipment. If the equipment has been damaged, report the damage on SF 364.

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with instructions of paragraph 1-3.

Check whether applicable MWO's have been applied.

Section III INSTALLATION PROCEDURES

Subject	Para	Page
General Information	2-4	2-3
MT-1029/VRC without Vinson J-Box C-3513	2-5	2-9
MT-1898/VRC without Vinson J-Box C-3514	2-6	2-10
MT-1029/VRC with Vinson J-Box C-3513 and MT-1898/VRC with Vinson J-Box C-3514	2-7	2-11
Inspecting Link Position in MT-1029/VRC and MT-1898/VRC	2-8	2-12
RT Antennas AS-1729 and AT-912	2-9	2-14
Auxiliary Receiver Antenna	2-10	2-30
Receiver-Transmitters RT-524 (*)/VRC and RT-246 (*)/VRC	2-11	2-34
Radio Set Control C-2742/VRC	2-12	2-37
Radio Set Control C-2299/VRC	2-13	2-38
Aux Receiver R-442 (*)/VRC	2-14	2-40
Determining Position of Power Control Link of a Radio Mount	2-15	2-42
Determining Position of X-MODE Switch of an RT	2-16	2-42
Determining Position of X-MODE Switch of R-442	2-17	2-44

2-4. GENERAL INFORMATION.

Procedures in this section describe the mounting of the AN/VRC-12 radio sets in any wheeled vehicle. The installation of any of the AN/VRC-12 series radio sets requires a radio set (basic unit) and an installation kit.

The radio set consists of the required receiver-transmitter(s) (RT-524/VRC or RT-246/VRC), auxiliary receiver(s) (R-442/VRC), and an RT antenna (AT-912/VRC or AS-1729/VRC).

The installation kit consists of mountings for the receiver-transmitter(s) (MT-1029/VRC) and the auxiliary receiver(s) (MT-1898/VRC). It also consists of all required cables, brackets (installation hardware), control boxes (C-2299/VRC and C-2742/VRC), audio accessories and an aux receiver antenna.

NOTE

When stop-gap installations are required for maneuvers, special projects, field tests, and emergency situations, or when special installations are needed and not listed in SB-11-132, Vehicular Radio Sets and Authorized Installations, requests should be submitted to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703.

For a complete listing of the radio set and the installation kit items of equipment for a particular wheeled vehicle, refer to TM 11-5820-401-10-1-HR.

For installation instructions for a specific AN/VRC-12 series radio set in a particular wheeled vehicle, refer to a corresponding 2300 series TM.

2-4. GENERAL INFORMATION. (CONT)

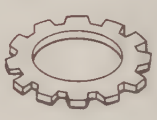
COMMONLY USED WASHERS

Each procedure requires the use of bolts, star washers and nuts for installation of components and grounding straps.

DOUBLE STAR WASHER

INTERNAL STAR WASHER

EXTERNAL STAR WASHER



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Star washers are used to make sure the mounting bolts or screws and nuts on the radio set items do not vibrate loose. The double star washer is used in all cases where a grounding strap is present (or larger bolts or screws with a threaded shaft of 1/4 inch and larger); this type of star washer will bite through the vehicle paint to insure good grounding.

External and internal star washers are used with small screws, but they may not bite through the paint.

NOTE

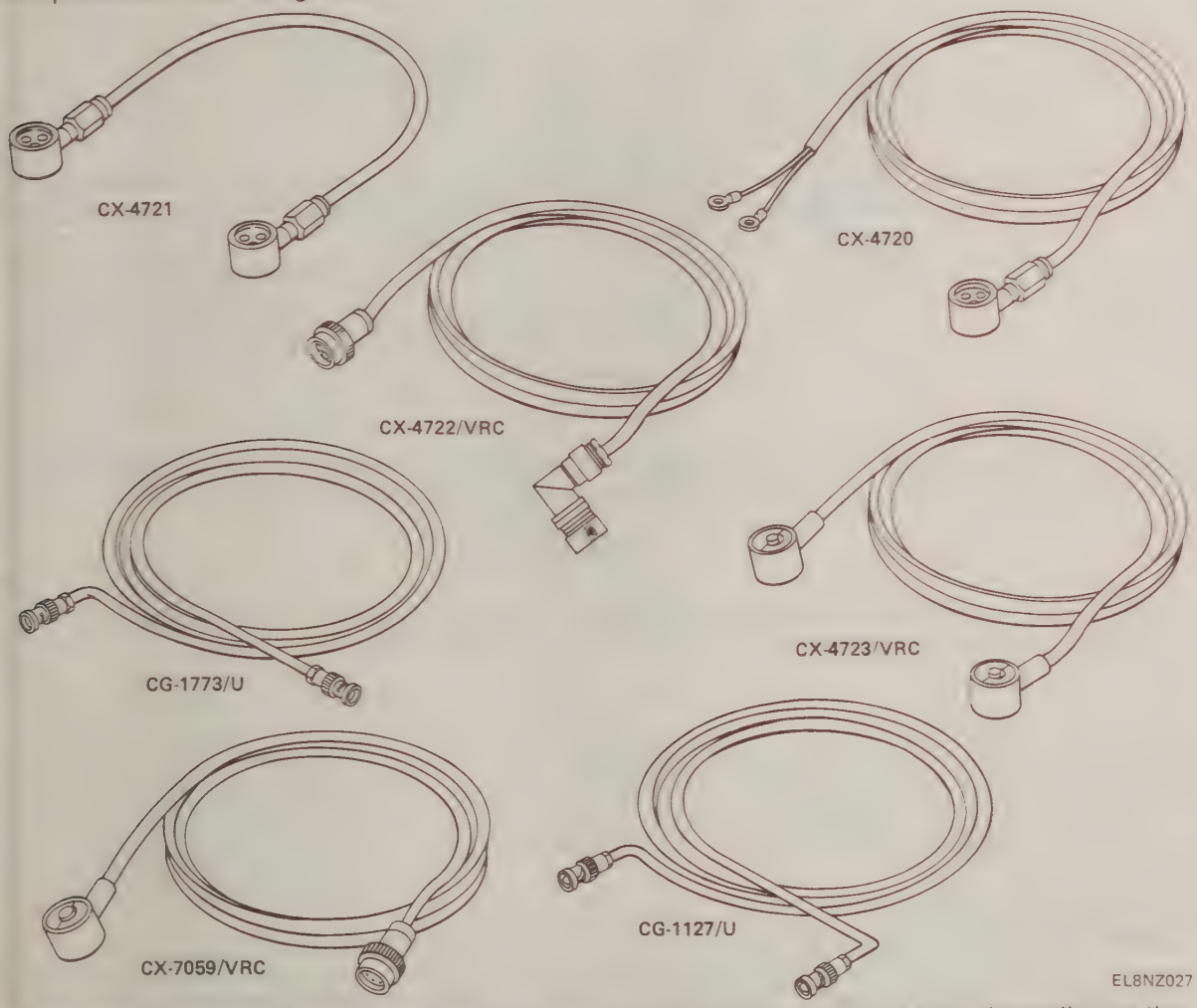
To insure good grounding, scrape paint off mating surfaces when small star washers are used or thick paint is present.

2-4. GENERAL INFORMATION. (CONT)

Installation procedures also provide for the required cabling for the AN/VRC-12 series radios. The configuration of the AN/VRC-12 series radio set to be installed depends on the vehicle and its mission. Refer to TM 5820-401-20-1-HR for the radio set components and installation kit for each type of vehicle.

IDENTIFYING AND TAGGING CABLE CONNECTIONS

To complete the installation of a radio set in a wheeled vehicle, various cables are used to connect the components of the set together.



The plug at the ends of a cable may be a right-angle (elbow) type or a straight type, depending on the cable routing requirements. For some cables, an elbow adaptor is available to change a straight connection to a right-angle connection.

In the future, to identify the cable plugs with their equipment jacks, write the numbers of the jack (J701, J702, J71, J72 etc) on a tag or decal and attach it to the cable plug. Do this when the plug is attached to the proper equipment jack.

NOTE

A printed set of decals is available for use in identifying cable plugs.

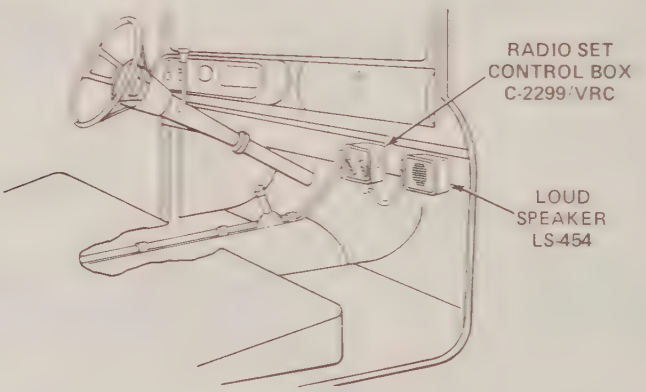
2-4. GENERAL INFORMATION. (CONT)

CABLE ROUTING AND PLUG ORIENTATION

Orientation of Cables

WARNING

Incorrect cable routing may cause the cable to extend into the crew compartment, resulting in injury to crewmembers.



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Connect cable as required by installation procedures in this section. If cables do not lie as shown in the installation illustration, or interfere with crew movement, reorient cables as follows.

WARNING

To safeguard against electrical shock and possible damage to equipment, remove or tape all personal exposed metal objects (e.g., watches, rings and medallions).

CAUTION

Cable plugs must be at the proper angle when mated to the corresponding jack, or the cable will obstruct the other cable connections to that component. It may also cause equipment damage.

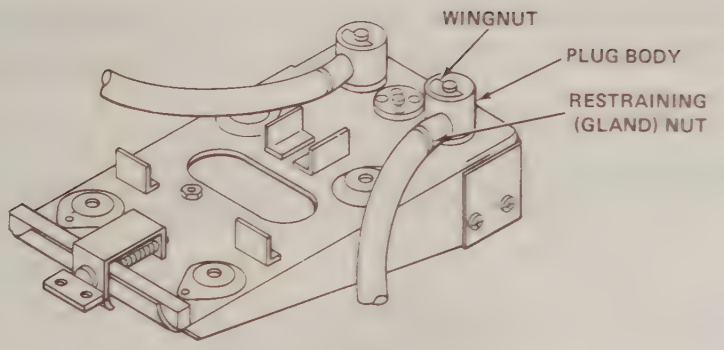
NOTE

Installation instructions for a particular vehicle include cable routing diagrams. Cable strapping directions must be followed to avert hazardous obstructions.

For proper routing of cables and placement of components, see chapter 1, section II, or an appropriate 2300 series TM.

2-4. GENERAL INFORMATION. (CONT)

Plug Orientation



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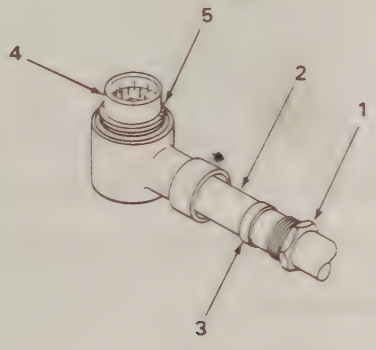
Plug orientation refers to the cable plug's position when connected to its corresponding jack. The plug body's angle depends upon the alinement of a cable plug keyway with its jack key.

Changing Plug Orientation

PRELIMINARY PROCEDURE: Unplug each end of cable from its jack.



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WARNING

Remove (turn off) power from a connector before removing or installing a cable. Connector pins may be damaged due to arcing. Extreme electrical hazards may exist that could cause death.

1. Using adjustable wrench, unscrew gland nut (1). Slide gland nut down cable (2).
2. Using small screwdriver, carefully remove packing (3). Slide packing down cable (2).
3. Using appropriate spanner wrench, remove locking ring (5) on pin side of plug.
4. Gently pull out pinblock assembly (4) until it can be rotated to desired position.

NOTE

In either direction, do not rotate pinblock assembly more than one-quarter turn (three notch positions) from center.

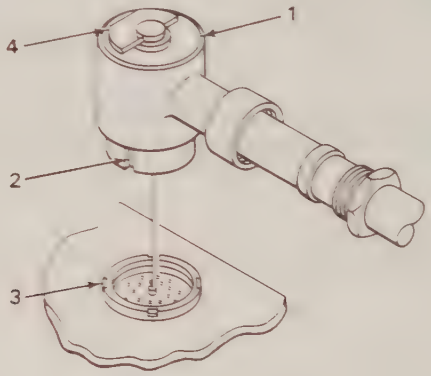
2-4. GENERAL INFORMATION. (CONT)

Changing Plug Orientation (Cont)

5. Replace pin-block assembly (4) and locking ring (5). Tighten with appropriate spanner wrench.
6. Replace packing (3) and gland nut (1). Using adjustable wrench, tighten gland nut (1).

CONNECTING CABLE PLUGS TO ASSOCIATED JACKS

PRELIMINARY PROCEDURE: Inspect pins of plug and associated jack for damage. (e.g., bent or missing pins). If necessary, using pliers, straighten.



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1. Check that locking rings (1) are tight. If necessary, using appropriate spanner wrench, tighten.
2. Aline plug keyway (2) with associated jack's key (3) and then gently press plug in until it initially seats (drops in).
3. Lift plug wingnut (4) and turn clockwise until plug is fully seated and tightly secured to its jack (fingertighten only).
4. Return plug's wingnut (4) to its stowed position.

CAUTION

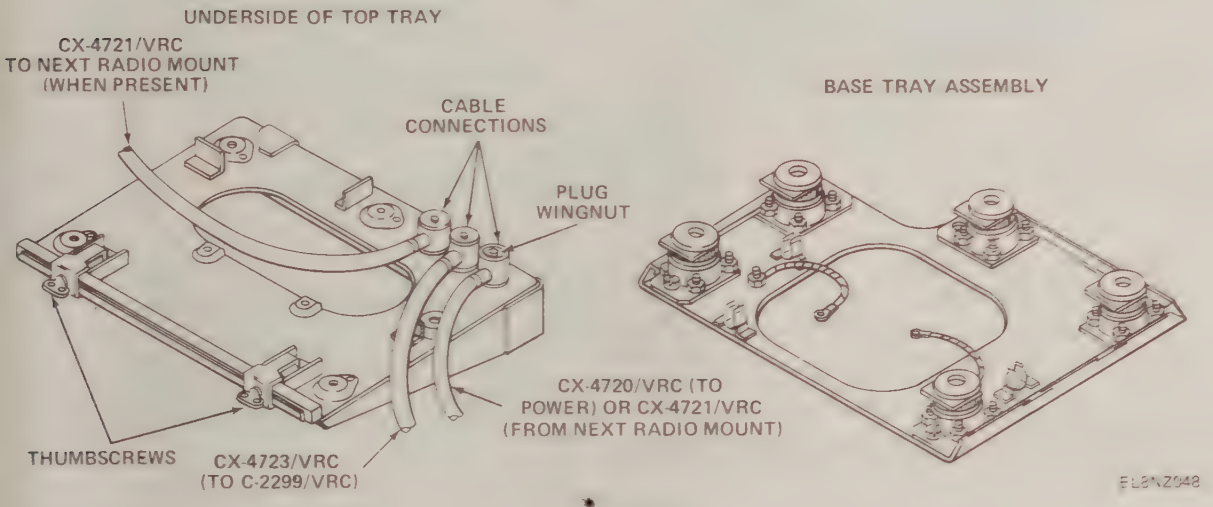
Do not attempt to reorient cables by adjusting equipment jacks. Damage to equipment could occur.

2-5. MT-1029/VRC WITHOUT VINSON J-BOX C-3513.

WARNING

Disconnect Power Cable CX-4720 from vehicle's batteries before removing a mount's J-box cover. **Extreme** electrical **hazards** exist within the J-box that could cause **death**.

PRELIMINARY PROCEDURE: Remove RT (if present) from mount tray.
Remove top tray from its base. (See paragraph 3-19.)
Turn tray over to see cable plug. The locking screws should be closest to you.



INSTALLATION

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. If plug orientation is not correct, see paragraph 2-4 for detailed procedure.
3. Lift and turn wingnut clockwise until plug is locked on jack. Fingertighten only.

CAUTION

Only change the orientation of the cable plug. Never change the jack orientation. Damage to equipment could occur.

4. Replace tray. (See paragraph 3-19).

2-5. MT-1029/VRC WITHOUT VINSON J-BOX C-3513. (CONT)

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4720/VRC	A-RT Mount MT-1029	J21	P2	Vehicle DC Power (Battery pack) (All configurations)		P1
CX-4721/VRC	MT-1029	J23	P1	B-Receiver Mount MT-1898 (AN/VRC -12,-44,-47,-48)	J11	P2
CX-4721/VRC		J23	P1	C-RT Mount MT-1029 (AN/VRC -45,-49)	J21	P2
CX-4723/VRC	A-RT Mount MT-1029	J22		C-2299/VRC (All configurations)	J701	
CX-4721/VRC	C-RT Mount MT-1029	J22		C-2299/VRC (AN/VRC -45,-49)	J702	

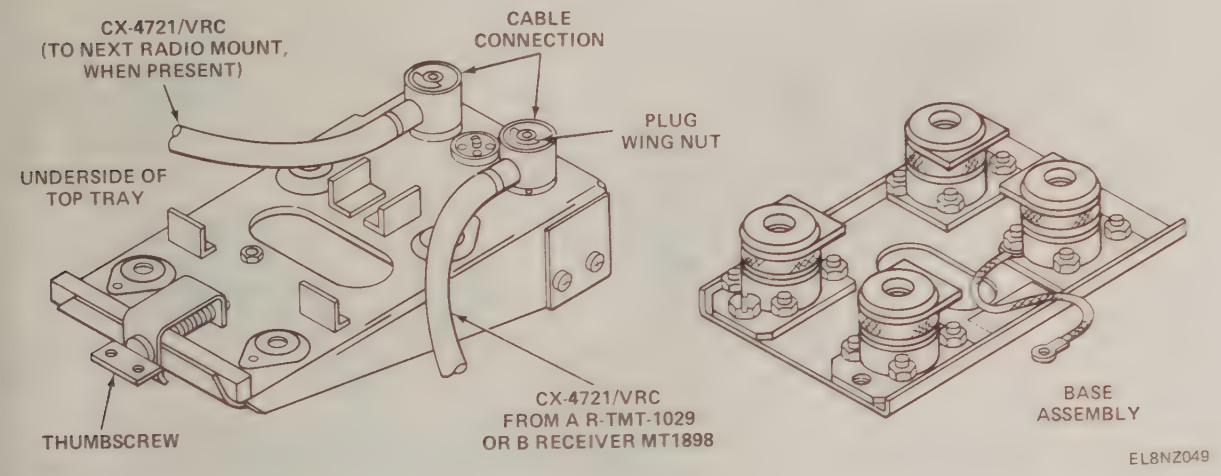
2-6. MT-1898/VRC WITHOUT VINSON J-BOX C-3514.

WARNING

Disconnect Power Cable CX-4720 from vehicle's batteries before removing a mount's J-box cover. **Extreme** electrical **hazards** exist within the J-box that could cause **death**.

PRELIMINARY PROCEDURE: Remove R-442/VRC from mount tray.
Remove top tray from its base. (See paragraph 3-19.)
Turn tray over to see cable plug. The thumbscrew should be closest to you.

2-6. MT-1898/VRC WITHOUT VINSON J-BOX C-3514. (CONT)



INSTALLATION

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. If plug orientation is not correct. see paragraph 2-4 for detailed procedure.
3. Lift and tighten wingnut until plug is locked on jack. Fingertighten only.
4. Replace tray. (See paragraph 3-19.)

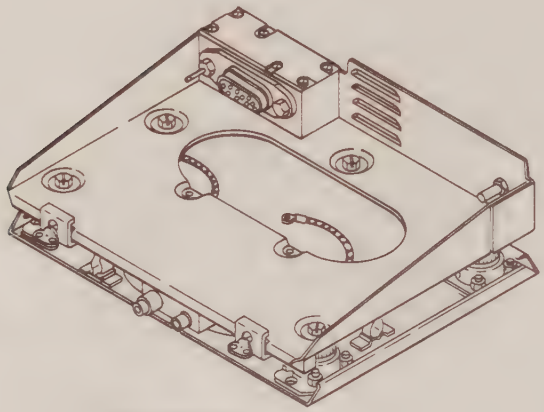
FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4721/VRC	B-Receiver Mount MT-1898	J11	P2	A-RT Mount MT-1029 (AN/VRC -12,-44, -47,-48)	J23	P1
CX-4721/VRC	B-Receiver Mount MT-1898	J13	P1	C-Receiver Mount MT-1898 (AN/VRC -44, -48)	J11	P2

2-7. MT-1029/VRC WITH VINSON J-BOX C-3513 AND MT-1898/VRC WITH VINSON J-BOX C-3514.

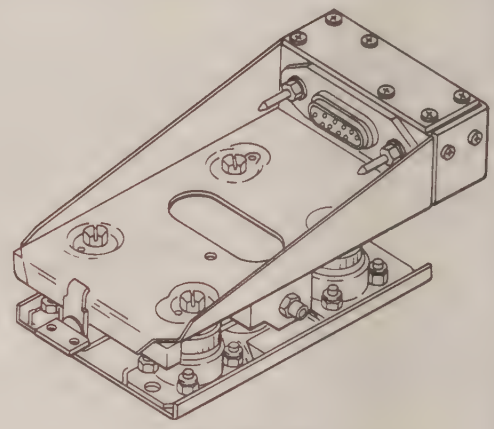
WARNING

Disconnect Power Cable CX-4720 from vehicle's batteries before removing a mount's J-box cover. **Extreme** electrical **hazards** exist within the J-box that could cause **death**.

2-7. MT-1029/VRC WITH VINSON J-BOX C-3513 AND MT-1898/VRC WITH VINSON J-BOX C-3514. (CONT)



MT-1029/VRC
WITH VINSON J-BOX
C-3513/U



MT-1898/VRC
WITH VINSON J-BOX
C-3514/U

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The Vinson J-boxes are installed between the top tray and the base assembly of the mountings. Install J-box C-3513 in the MT-1029. Install the J-box C-3514 in the MT-1898. Refer to TM 11-5820-312-12 for nomenclature of kits, installation instructions, repair parts, and some operator procedures.

CABLE CONNECTIONS: See paragraph 3-22.

2-8. INSPECTING LINK POSITION IN MT-1029/VRC AND MT-1898/VRC.

WARNING

Disconnect Power Cable CX-4720 from vehicle's batteries before removing a mount's J-box cover. **Extreme** electrical **hazards** exist within the J-box that could cause **death**.

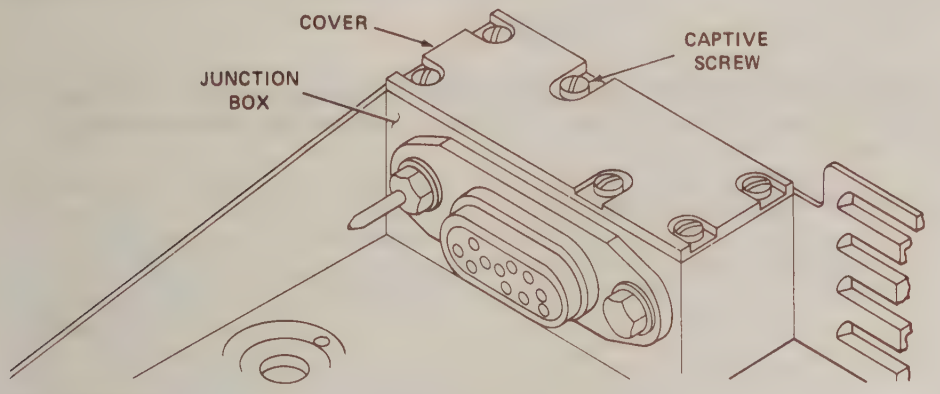
Inspecting the link position is usually done after replacing the MT-1029/VRC or the MT-1898/VRC in a vehicle before their radio components are installed.

When installing the MT-1029/VRC and MT-1898/VRC radio mounts in wheeled vehicles, the POWER LINK within the A-RT mount junction box is normally set for direct dc power control and the MT-1898 mount junction box is set for remote dc power. When an A-RT mount is set for REMOTE, the A-RT will not turn on. The C-RT mount (or the B- or C-receiver mount) is usually set to REMOTE. When other radio components are set for REMOTE dc input power control, those radio components cannot be turned on until the A-RT is turned on.

NOTE

The A-RT mount junction box should have the link on the center pivotal screw (E23) and (E24) (DIRECT) position. The C-RT mount junction box link is usually set on the pivotal screw (E23) and (E22) (REMOTE) position. The link inside the MT-1898 junction box should be to (E12) (REMOTE) position.

8. INSPECTION LINK POSITION IN MT-1029/VRC AND MT-1898/VRC. (CONT)



EL8NZ051

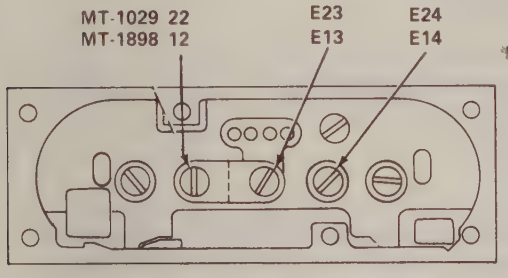
NITIAL PROCEDURE

1. Remove junction box cover of MT-1029 or MT-1898.
   a. Using screwdriver, loosen six captive screws.
   b. Using screwdriver, pry off cover.

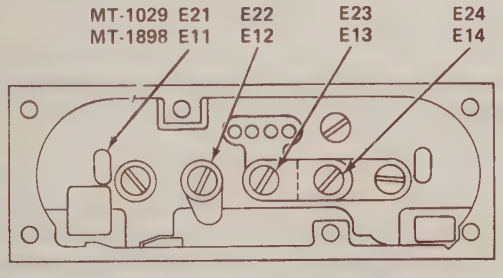
CAUTION

Do not damage gasket between J-box and its cover.

2. Look inside J-box. See if link is in correct position.



LINK SHOWN IN REMOTE POSITION



LINK SHOWN IN DIRECT POSITION

EL8NZ052

TO CHANGE LINK POSITION (IF NEEDED):

1. Using screwdriver, loosen terminal screws E22 (E12), E24 (E14) and pivotal screw E23 (E13). (Do not remove.)
2. Swing link so it is between pivotal screw E23 (E13) and E22 (E12) (DIRECT), or E24 (E14) (REMOTE).
3. Using screwdriver, tighten screws E22 (E12), E23 (E13) and E24 (E14).

CAUTION

For older models, insure fuse lugs are lined up with terminal board holes while replacing cover.

4. Replace cover. Using screwdriver, tighten six captive screws.

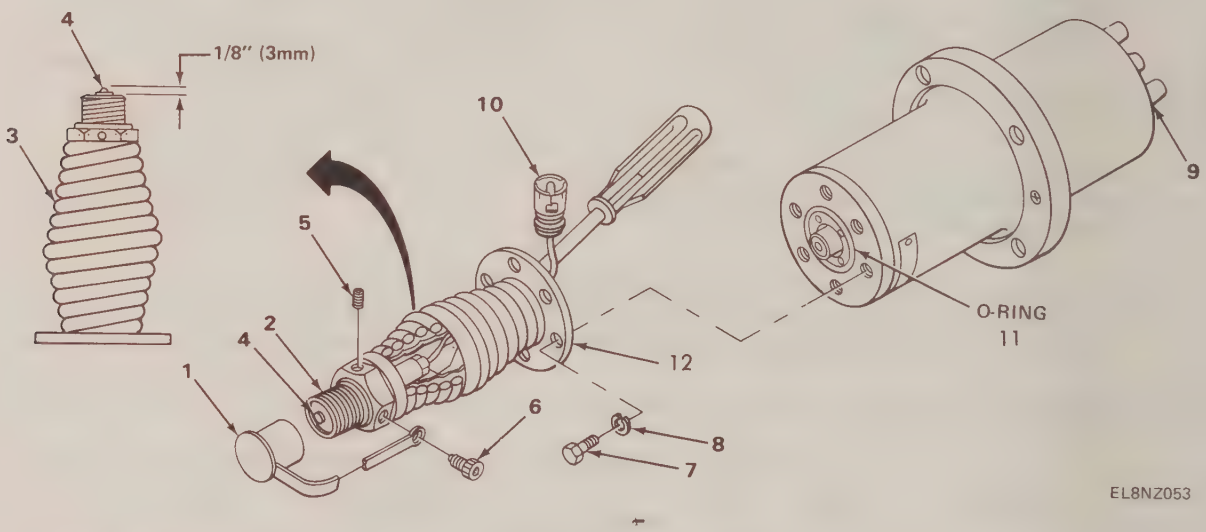
2-9. RT ANTENNAS AS-1729 AND AT-912.

GENERAL

This paragraph provides procedures for the installation of the RT antenna systems AT-912 and AS-1729. Each antenna will have its own procedure. The procedure for installing the antenna elements will be the same.

TOOLS: Tool Kit, Electronic Equipment TK-101/G

INSPECTING TIP CONTACT OF MX-6707



1. Pull off dust cover (1) from threaded portion (2) of spring assembly (3).
2. See that tip contact (4) is about 1/8 inch above threaded portion (2).

NOTE

If tip contact is 1/8 inch above the threaded portion, go to installation of matching unit (page 2-19.) If the tip contact is not 1/8 inch above the threaded portion, do steps 1 through 9 below.

CHANGING THE LENGTH OF MX-6707 TIP CONTACT

1. Using 7/16-inch wrench, loosen and remove six bolts (7) and lockwashers (8).
2. Remove spring assembly (3) and unplug rf cable (10) from matching unit. (Do not lose O-ring.)
3. Using 3/32-inch hex wrench, loosen two setscrews (5) and a third hex (cap) screw (6).

CAUTION

When doing step 4, do not cut rf cable (10) with screwdriver. Hold rf cable (10) to one side of spring assembly (3).

4. Insert flat-tip screwdriver into spring assembly (3) and push gently on bottom of tip contact (4) until tip extends 1/8 inch above threaded portion (2) of the spring assembly (3).

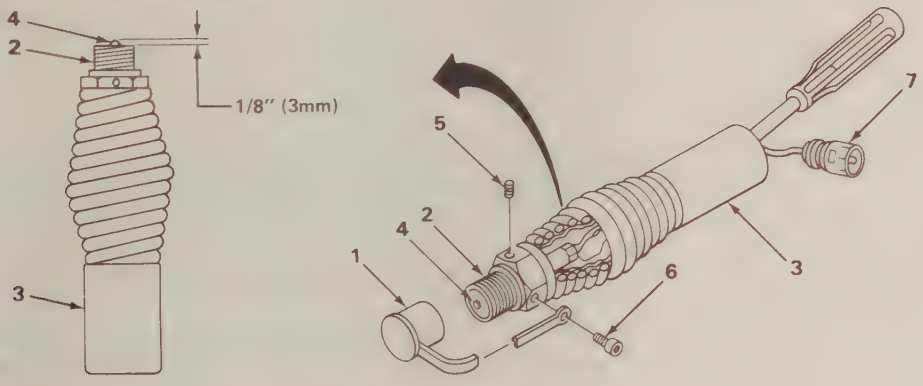
2-9. **RT ANTENNAS AS-1729 AND AT-912.** (CONT)

NOTE

If tip contact is worn and does not extend above the threaded portion, reassemble element and refer matching unit to higher level of maintenance.

5. Using hex wrench, tighten two setscrews (5) and third hex (cap) screw (6).
6. Coat O-ring (11) with silicone compound (item 1, appendix C).
7. Replug rf cable (10). Place spring assembly onto matching unit. Press down gently.
8. Aline mounting holes on spring assembly flange (12) and matching unit (9).
9. Using torque wrench with 7/16-inch socket, install six bolts (7) and star washers (8). Tighten to 40 in. lb torque.

INSPECTING TIP CONTACT OF MX-2799 (AB-719)



EL8NZ115

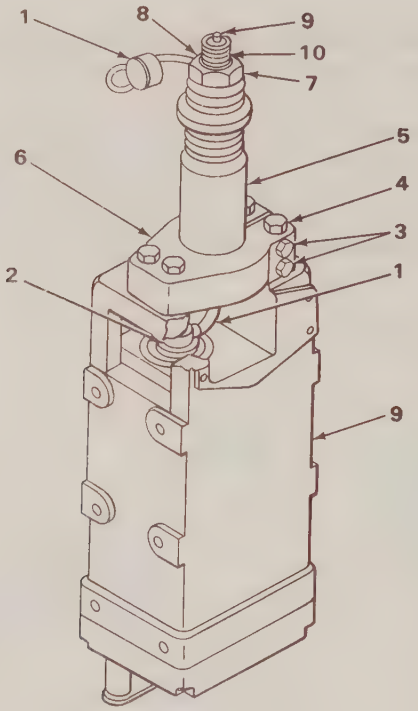
1. Pull off dust cover (1) from threaded portion (2) of spring assembly (3).
2. See that tip contact (4) is 1/8 inch above threaded portion (2).

NOTE

If tip contact is 1/8 inch above the threaded portion, go to installation of matching unit. If tip contact is not 1/8 inch above the threaded portion, see page 2-16.

2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

CHANGING LENGTH OF MX-2799 (AB-719) TIP CONTACT



EL8NZ186

1. Unplug rf cable plug (1) from MX-2799 jack (2).
2. Using 1/2-inch wrench, loosen two side bolt nuts (3) and two top bolts (4).
3. Remove spring assembly (5) from its C-clamp (6).
4. Using 3/32-inch hex wrench, loosen two setscrews (7) and capscrew (8).

CAUTION

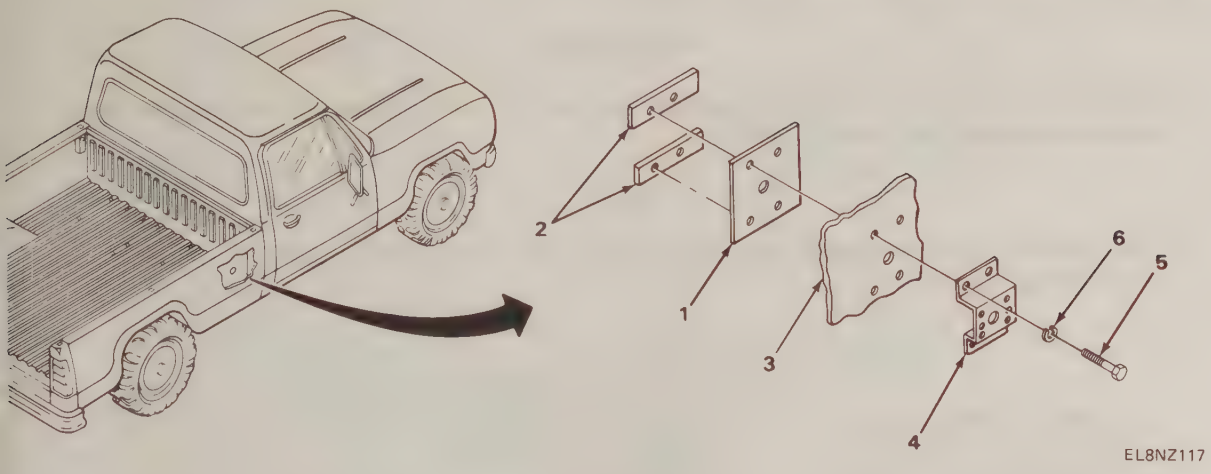
When doing step 5 below, do not cut rf cable (1) with screwdriver. Hold rf cable (1) to one side.

5. Push tip contact (9) up gently until tip contact extends 1/8 inch above top of threaded portion (10).
6. Using 3/32-inch hex wrench, tighten two setscrews (7) and a capscrew (8).
7. Insert spring assembly (5) into its C-clamp (6) and connect rf cable plug (1) to MX-2799 rf jack (2). (Position spring assembly (5) so that connected rf cable (1) is not crimped.)
8. Tighten two side bolt nuts (3) and two top bolts (4).

INSTALLATION OF VEHICLE MOUNTING BRACKET

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Have motor pool drill holes into vehicle.

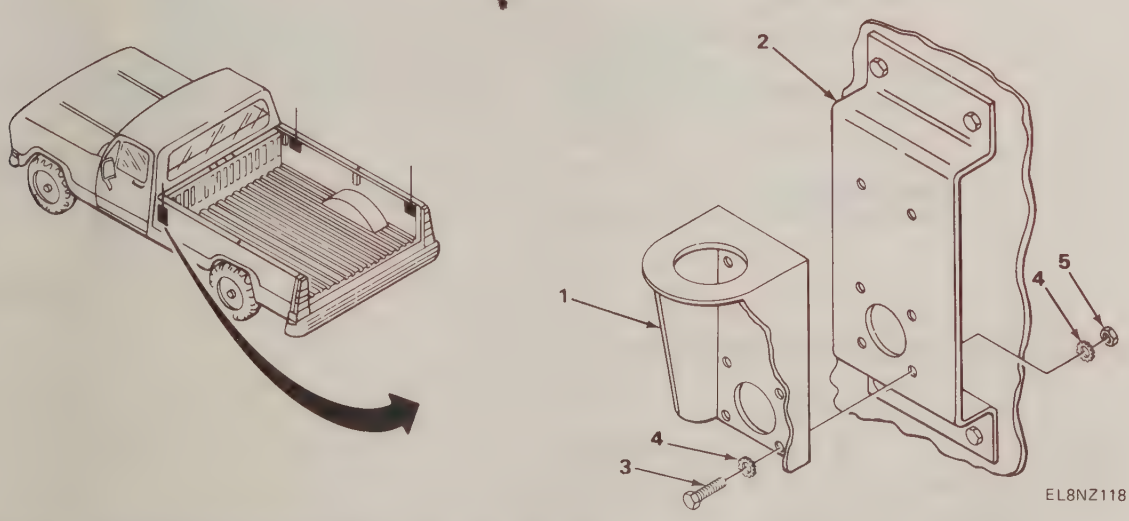
2-9. **RT ANTENNAS AS-1729 AND AT-912.** (CONT)



1. Insert reinforcing plate (1) and two nut plates (2) inside wall of vehicle (3) and aline holes.
2. Place mounting bracket (4) against vehicle wall (3). Insert four hex bolts (5).
3. Using 7/16-inch box-end wrench, tighten hex bolts (5).

INSTALLATION OF ANTENNA MOUNTING BRACKET

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Install vehicle mounting bracket.



1. Place antenna mounting bracket (1) against vehicle mounting bracket (2) and aline holes.
2. Insert six bolts (3) and star washers (4) through mounting bracket (1) and vehicle mounting bracket (2).
3. Place nuts (5) and star washers (4) on tip of bolts (3).
4. Using 7/16-inch box-end wrench, tighten bolts.

2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

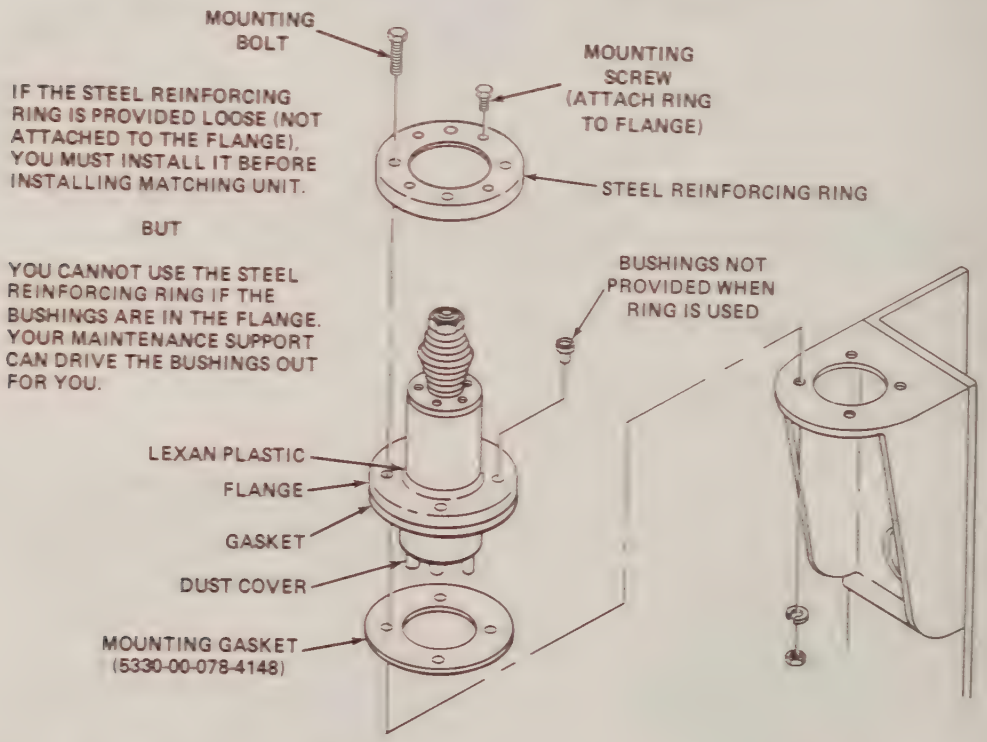
INSTALLATION OF MX-6707 REINFORCING RING

CAUTION

A steel reinforcing ring must be installed on matching units. The ring protects the Lexon plastic flange and keeps water from the gasket.

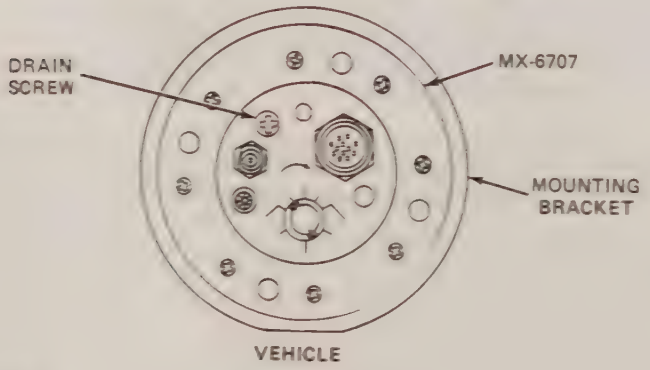
NOTE

If the matching unit already has a steel reinforcing ring attached to the flange. go to the installation procedures.


MOUNTING BOLT
MOUNTING SCREW (ATTACH RING TO FLANGE)
IF THE STEEL REINFORCING RING IS PROVIDED LOOSE (NOT ATTACHED TO THE FLANGE), YOU MUST INSTALL IT BEFORE INSTALLING MATCHING UNIT.
STEEL REINFORCING RING
BUT
YOU CANNOT USE THE STEEL REINFORCING RING IF THE BUSHINGS ARE IN THE FLANGE. YOUR MAINTENANCE SUPPORT CAN DRIVE THE BUSHINGS OUT FOR YOU.
BUSHINGS NOT PROVIDED WHEN RING IS USED
LEXAN PLASTIC FLANGE
GASKET
DUST COVER
MOUNTING GASKET (5330-00-078-4148)

EL8NZ210

INSTALLATION OF MATCHING UNIT MX-6707

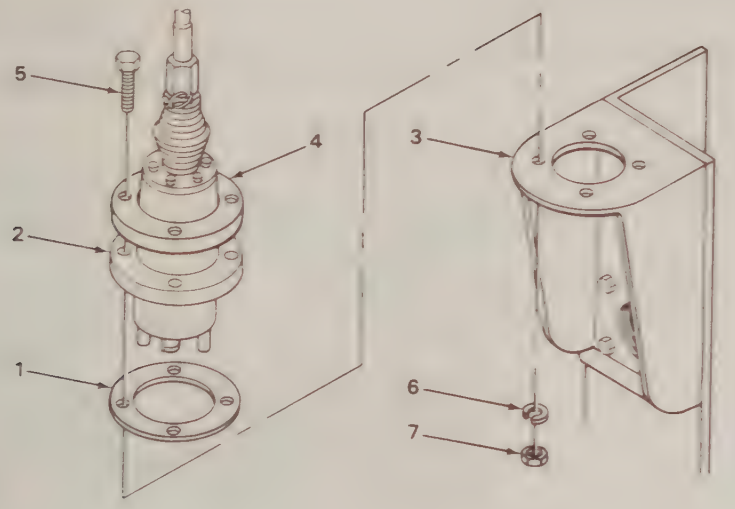


CAUTION

WHEN INSTALLING THE MATCHING UNIT IN BRACKET, ALWAYS POSITION THE DRAIN SCREW OPPOSITE THE VEHICLE.

EL8NZ185

2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)



EL8NZ116

To install MX-6707:

1. Place gasket (1) (part of hardware kit) around matching unit (2).
2. Place matching unit (2) into mounting bracket (3).
3. Place steel reinforcing ring (4) around matching unit (2).
4. Insert four bolts (5) through matching unit (2).
5. Place four lockwashers (6) and nut (7) on four bolts (5) from bottom side of matching unit (2).

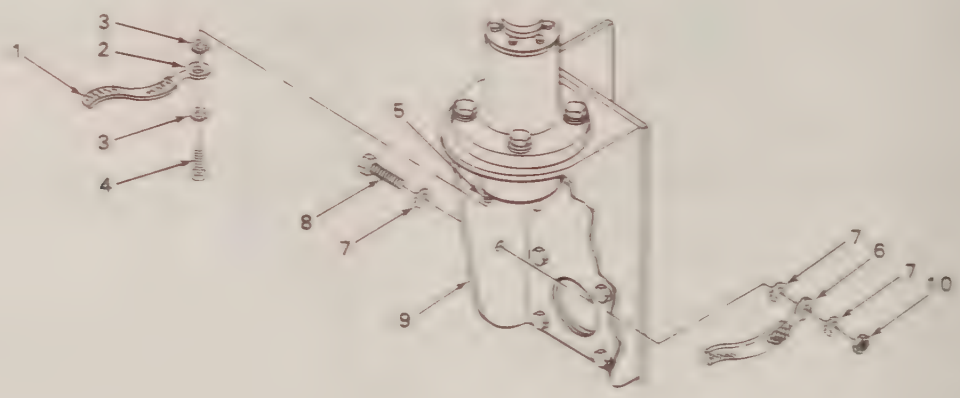
CAUTION

Overtightening of hardware may damage matching unit (2).

6. Using a torque wrench with a 9/16-inch socket wrench, tighten bolts (5) to 100 in. lb.

2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

INSTALLATION OF GROUND STRAP FOR MATCHING UNIT MX-6707



WARNING

To prevent possible electrical shock, make certain that the ground strap is correctly grounded to the vehicle body.

1. Position ground strap (1) so terminal lug with smaller hole (2) is toward matching unit's threaded post (5).
2. Insert bolt (4) through star washer (3), lug (2), another star washer (3) and into threaded post (5). Using 7/16-inch wrench, tighten until snug.
3. Position other end of ground strap (1) so terminal lug with larger hole (6) is toward vehicle's mounting bracket (9).
4. Insert bolt (8) through star washer (7), mounting bracket (9), star washer (7), lug (6) and another star washer (7) and into nut (10). Using 7/16-inch wrench, tighten until snug.

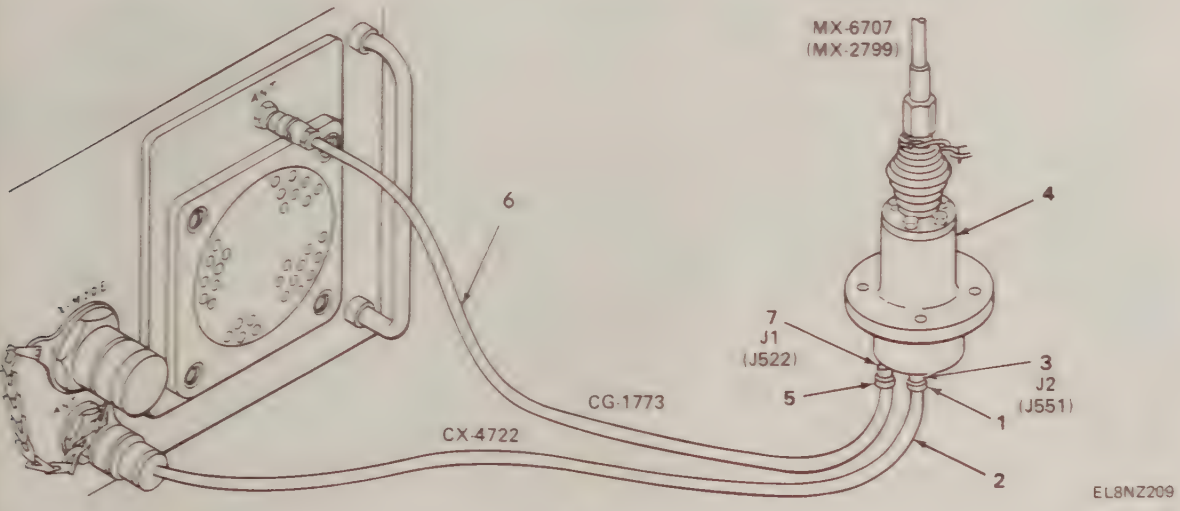
2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

INSTALLATION OF CABLES

PRELIMINARY PROCEDURE: Install RT. See paragraph 2-11.

CAUTION

Before connecting cables to the matching unit, turn Rt POWER switch to OFF. Connector pins may be damaged due to arcing if this precaution is not observed.



NOTE

Always connect the large cable (CX-4722/VRC) to the matching unit connector or J2 before connecting the small cable (CG-1773/U).

For MX-6707 (MX-2799):

1. Connect plug (1) of Control Cable CX-4722 (2) to Jack J2 (J551) (3) of matching unit (4).
2. Connect plug (5) of RF Cable CG-1773 (6) to Jack J1 (J552) (7) of matching unit (4).

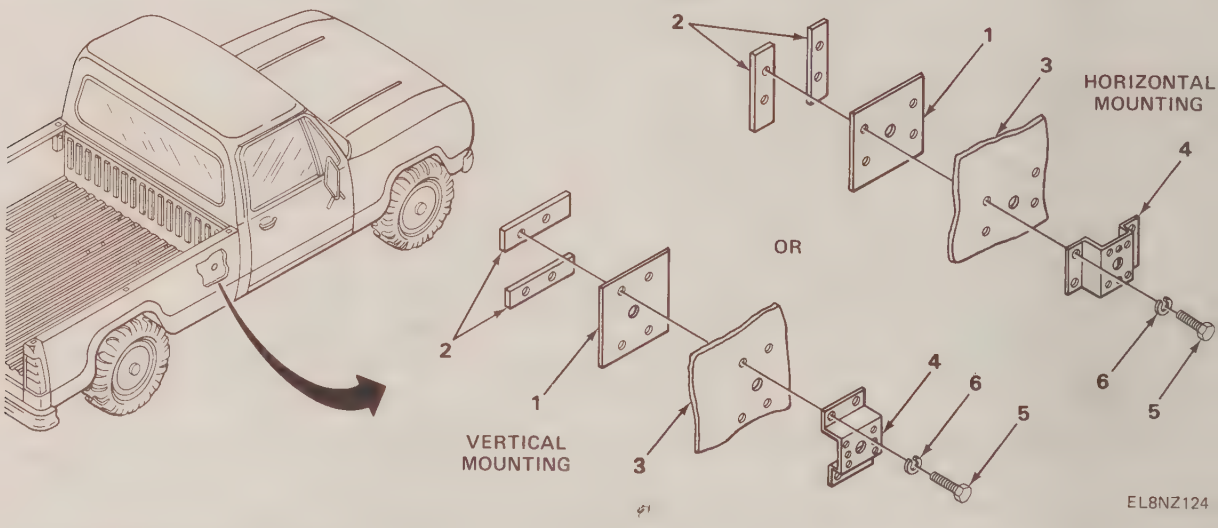
2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

INSTALLATION OF MX-2799 AND CABLE CONNECTIONS

Installation of Mounting Brackets

The MX-2799 can be mounted either vertically or horizontally. The procedure for vertical mounting is followed by the horizontal mounting.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Have motor pool drill holes into vehicle.



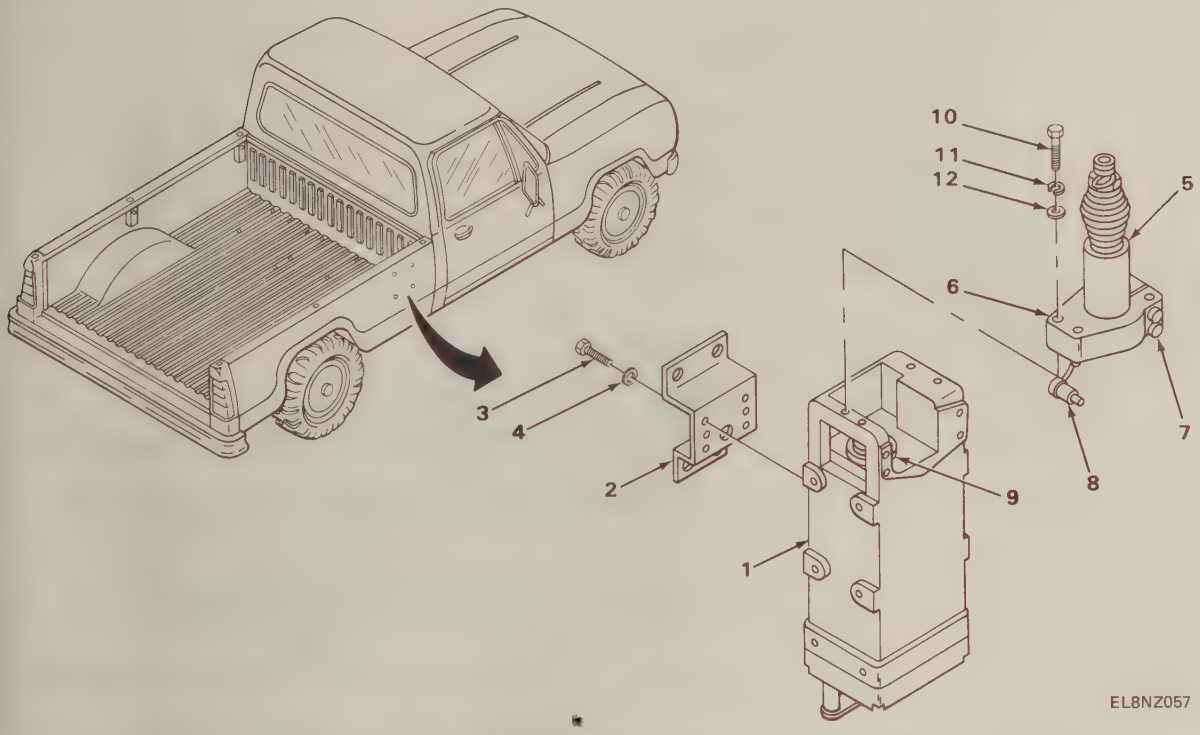
1. Insert reinforcing plate (1) and two nut plates (2) inside wall of vehicle (3) and aline mounting holes.
2. Place mounting bracket (4) against vehicle wall (3).
3. Insert four hex bolts (5) and lockwashers (6) through bracket and into nut plates (2).
4. Using 7/16-inch box-end wrench, tighten hex bolts (5).

NOTE

The mounting bracket (4) can be mounted vertically or horizontally (for application with the AT-912).

9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

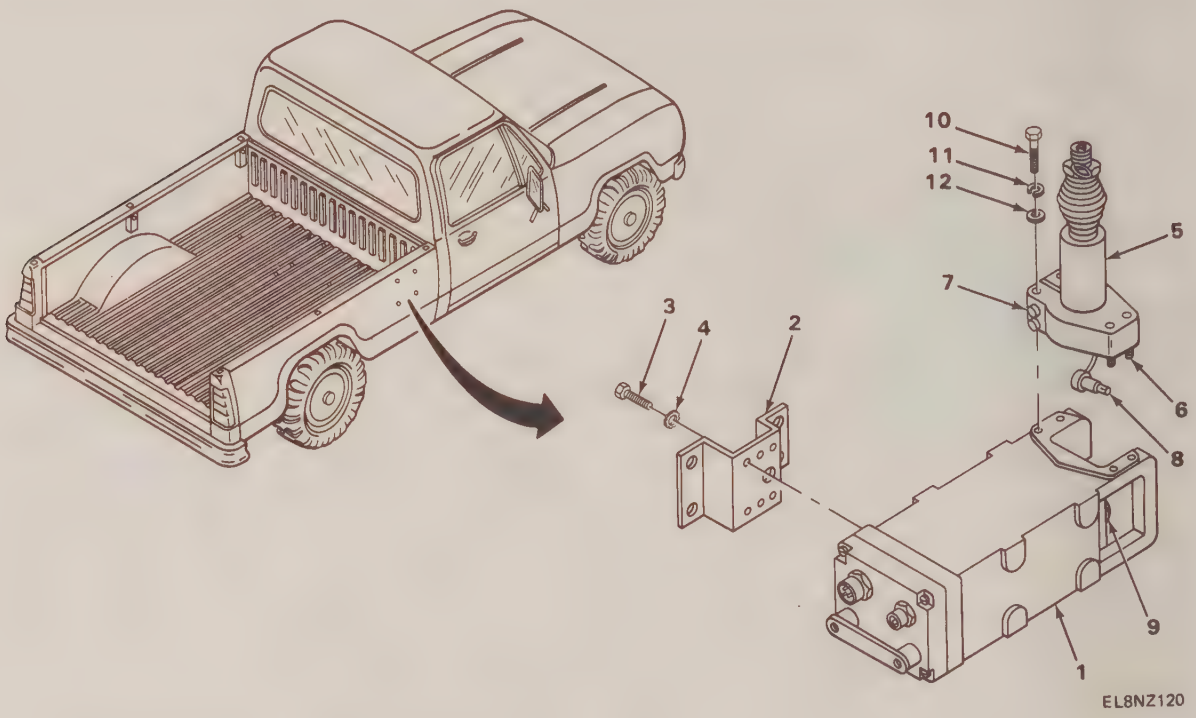
Installation of Antenna Base AB-719 and Matching Unit MX-2799 (Vertical Mounting)



1. Place matching unit (1) against vehicle mounting bracket (2) and aline holes.
2. Insert six hex bolts (3) and star washers (4) through holes and into matching unit (1).
3. Using 7/16-inch box-end wrench, tighten hex bolts (3).
4. Insert spring assembly (5) into painted top of C-clamp (6) until bottom of clamp (6) and bottom of spring assembly (5) are even.
5. Using wrench, tighten two nuts (7).
6. Connect BNC plug (8) to BNC jack (9).
7. Place clamp (6) on top of matching unit (1) and aline holes.
8. Insert four hex bolts (10), lockwasher (11), and flat washers (12) through holes.
9. Using 7/16-inch box-end wrench, tighten four hex bolts (10).

2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

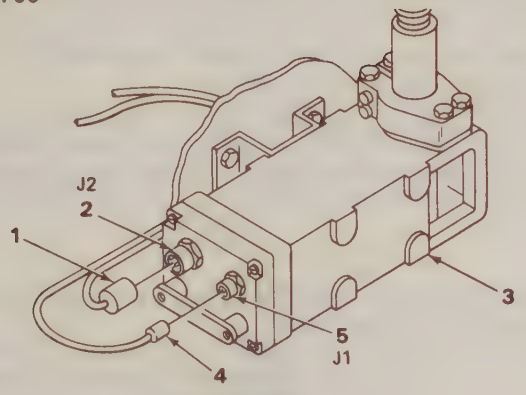
Installation of Antenna Base AB-719 and Matching Unit MX-2799 (Horizontal Mounting)



1. Place matching unit (1) against vehicle mounting bracket (2) and aline holes.
2. Insert six hex bolts (3) and star washers (4) through holes and into matching unit (1).
3. Using 7/16-inch box-end wrench, tighten hex bolts (3).
4. Insert spring assembly (5) into painted top of clamp (6) until bottom of clamp (6) and bottom of spring assembly (5) are even.
5. Using 7/16-inch box-end wrench, tighten two nuts (7).
6. Connect BNC plug (8) to BNC jack (9).
7. Place clamp (6) on top of matching unit (1) and aline holes.
8. Insert four hex bolts (10), lockwasher (11), and flat washers (12) through holes.
9. Using 7/16-inch box-end wrench, tighten four hex bolts (10).

2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

CABLE CONNECTIONS FOR MX-2799



EL8NZ119

CAUTION

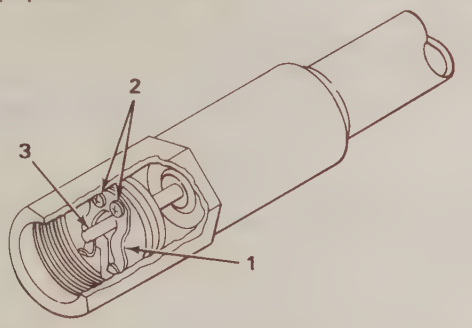
Before connecting cables to the matching units turn RT POWER switch OFF. Connector pins may be damaged due to arcing if this precaution is not observed.

Always connect the large cable (CX-4722) to the matching unit before connecting the small rf cable (CG-1773/U).

1. Connect Cable CX-4722 plug (1) to Jack J2 (2) on matching unit (3).
2. Connect Cable CG-1773/U plug (4) to Jack J1 (5) of matching unit (3).

INSPECTION OF LOWER ELEMENT HORSESHOE CONTACT

TOOLS: Tool Kit, Electronic Equipment TK-101/G



EL8NZ059

1. Check that horseshoe contact (1) is not damaged (e.g., flattened or broken).

NOTE

If horseshoe contact (1) is damaged, refer unit to higher level of maintenance.

2. Using screwdriver, tighten screws (2) if loose.
3. Using finger or screwdriver, push against button contact (3). Check spring action.

NOTE

If the button contact (3) does not spring back, refer unit to higher level of maintenance.

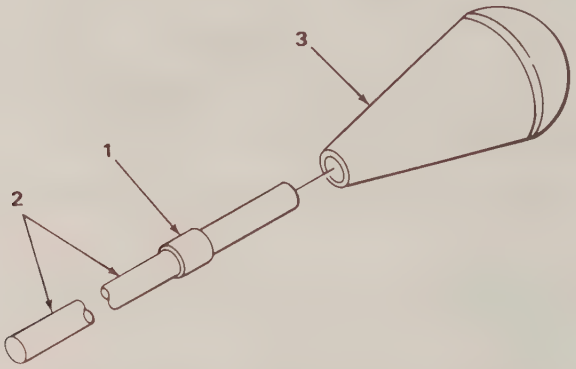
2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

INSTALLATION OF ANTENNA TIP CAP ON AT-1095 (RT) AND MS-118 (AUX RECEIVER)

MATERIALS/PARTS: Pressure-sensitive tape (item 4, appendix C)
Insulation tape (item 3, appendix C)
PRELIMINARY PROCEDURE: Insure proper length of upper element:
AT-1095/VRC: 64 1/2 inches (163.83 cm) long.
MS-118A: 39 3/4 inches (100.33 cm) long.

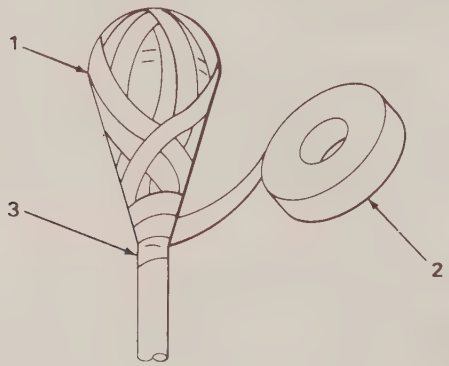
CAUTION

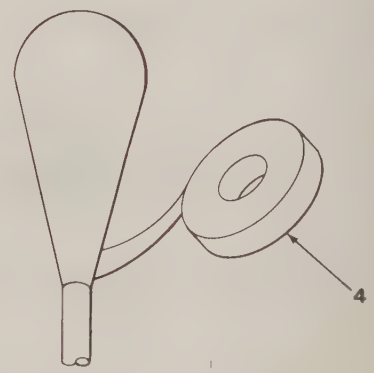
The antenna tip cap assembly and its plastic slotted end have to be reinforced and secured by pressure-sensitive tape and insulator tape.



EL8NZ071

1. Wrap six or seven layers of 1/2-inch-wide pressure-sensitive tape (1) (item 4, appendix C) 2 inches from upper element (2) tip.
2. Place antenna tip cap (3) over tip of upper element (2). Push down until tip cap (3) (lower slotted part) rests in contact with tape (1).





EL8NZ072

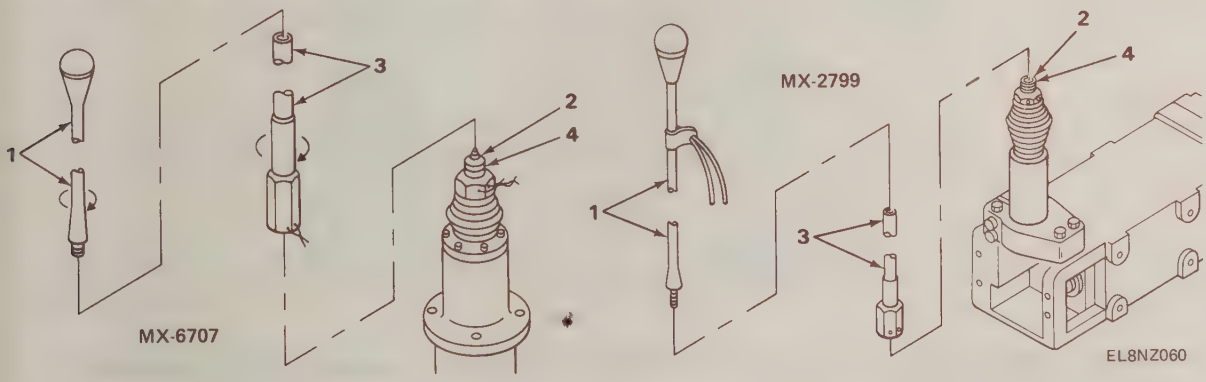
2-9. **RT ANTENNAS AS-1729 AND AT-912.** (CONT)

3. Start taping at tip cap (3) slot. Wrap tape (1) across tip cap (3), conforming with shape of tip cap (3) so that tape (1) goes over cap tip and returns to slotted end. Cut tape (1). (Repeat step until all slots have been reinforced and tip cap is completely covered.)
4. Start wrapping 1/2-inch-wide electrical tape (item 3, appendix C) (4) on upper element (2) just below pressure-sensitive tape (1), following tip contour while lightly stretching electrical tape (4). Wrap over top and back to starting position on element (2). (Repeat until entire tip assembly is completely covered and lower end is neatly tapered to upper element (2).)

CAUTION

Replace the electrical tape when excessively scuffed or weathered. The electrical insulating tape seals and protects the pressure-sensitive tape from the effects of sunlight and moisture.

ASSEMBLY OF ANTENNA ELEMENTS OF AS-1729 AND AT-912



1. Apply silicone compound (item 1, appendix C) to threads (2) of upper elements (1).
2. Screw upper element (1) into lower element (3) and handtighten.

NOTE

The bottom of the lower element (2) should cover the O-ring (4).

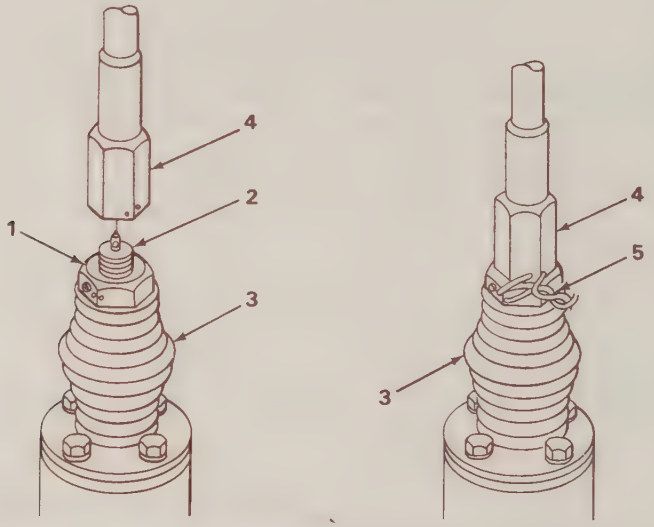
2-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

SECURING ASSEMBLED ANTENNA ELEMENTS TO MATCHING UNITS MX-2799 AND MX-6707

WARNING

Do not install antenna elements in an electrical storm.

PRELIMINARY PROCEDURE: Assemble antenna elements. (See page 2-27.)
Install tip cap. (See page 2-26.)



EL8NZ188

1. Apply silicone compound (item 1, appendix C) to O-ring (item 7, appendix C) (1) of threaded portion (2) of spring assembly (3).
2. Apply light coat of silicone compound (item 1, appendix C) to threaded portion (2) of spring assembly (3).
3. Screw lower element (4) on threaded portion (2) of spring assembly (3).

NOTE

When lower element (4) is properly seated on spring assembly (3), O-ring (1) cannot be seen.

4. Insert safety wire (item 2, appendix C) (5) through hole in lower element (4).
5. Insert other end of safety wire (5) through hole in spring assembly (3). Using flat-nose pliers, twist free ends of safety wire (5) three to six times, (pigtail method).
6. Cut excessive ends of safety wire (5). Bend remaining safety wire pigtail against hexagonal portion of spring assembly (3).

NOTE

The safety wire helps keep the lower element from coming loose from the spring while traveling.

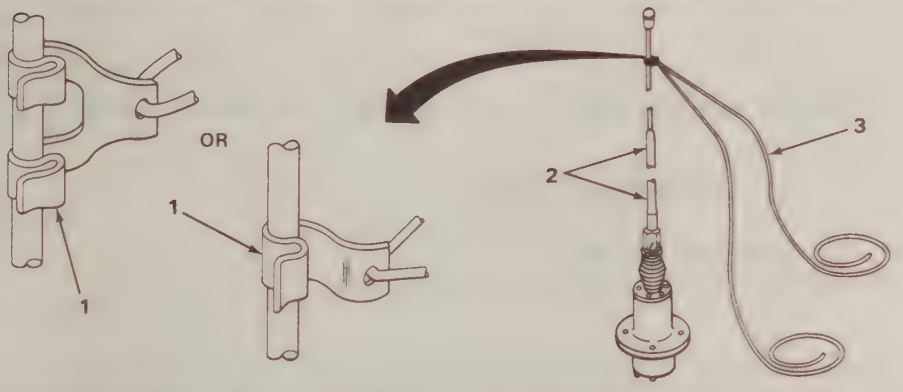
-9. RT ANTENNAS AS-1729 AND AT-912. (CONT)

IEDOWN PROCEDURE FOR AS-1729 AND AT-912 ANTENNA ELEMENTS

RELIMINARY PROCEDURE: Tie down the rope placed through tiedown assembly.

WARNING

Do not use RT for transmission while attaching the antenna tiedown assembly.



1. Slide locking jaw of tiedown assembly (1) around middle of upper element (2).

NOTE

Antenna element must be installed in tiedown assembly as illustrated to prevent antenna from coming loose.

2. Pull tiedown assembly rope (3) so antenna is at a 30° to 45° angle to ground.

CAUTION

Be sure that the tip of antenna is not projecting on the outside of the vehicle.

3. Tie both ends of tiedown assembly rope (3) to convenient places on the vehicle. The bowline knot is the typical tiedown method.

CAUTION

The use of a bowline knot is recommended to prevent damage to the antenna. The bowline knot will not come loose easily if the antenna should strike any object, preventing the antenna from returning to an upright position.

NOTE

Do not cross antenna elements when tying down.

The antenna may be used in the tied-down position.

If the end of tiedown rope unravels, cut off the unraveled part. Put the end over a flame for a moment to seal the threads.

2-10. AUXILIARY RECEIVER ANTENNA.

GENERAL

There are two different antenna bases used with the auxiliary receiver. The most common base used on wheeled vehicles is the AB-15/GR, which is the first installation given. The AB-558/GR installation follows the AB-15/GR, followed by the remaining procedures which apply to both antennas.

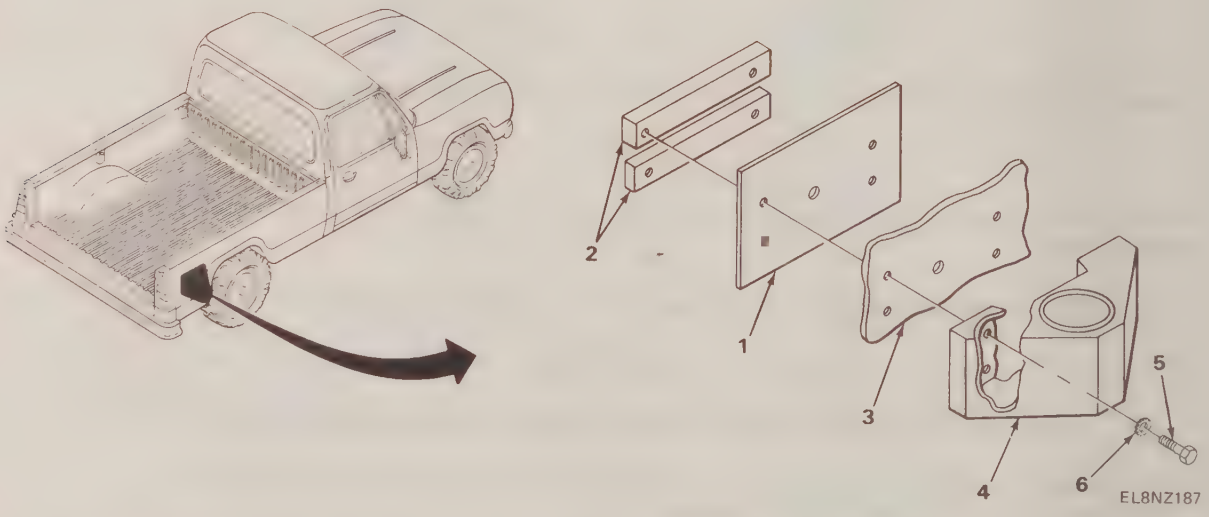
AUX RECEIVER ANTENNA MOUNTING BRACKET

NOTE

For installation of AB-558/GR auxiliary antenna mounting bracket, see paragraph 2-9 for bracket mounting.

INSTALLATION OF AB-15 VEHICLE MOUNTING BRACKET

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Have motor pool drill holes into vehicle.

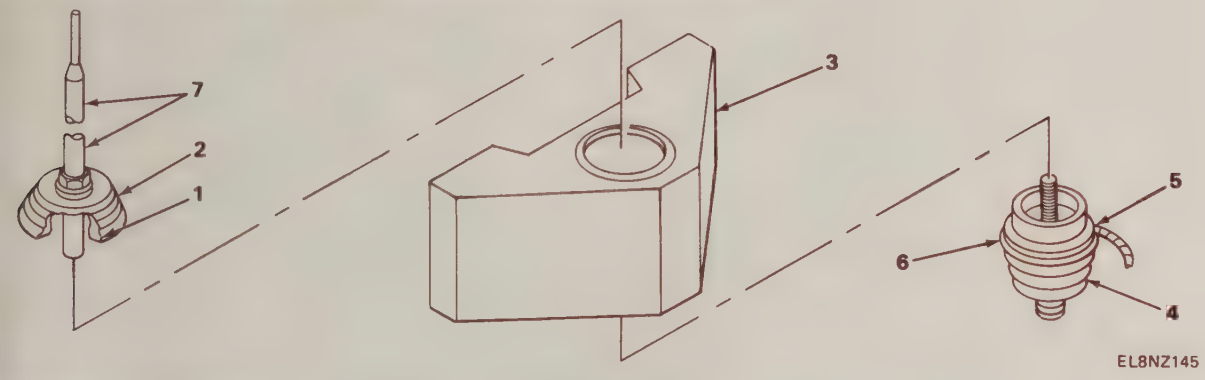


1. Insert reinforcing plate (1) and two nut plates (2) inside wall of vehicle (3) and aline holes.
2. Place mounting bracket (4) against vehicle wall (3).
3. Insert four hex bolts (5) through star washer (6), bracket (4) and into nut plates (2).
4. Using 7/16-inch wrench, tighten.

10. **AUXILIARY RECEIVER ANTENNA.** (CONT)

STALLATION OF ANTENNA BASES AB-15/GR AND AB-558/GR

OOLS: Tool Kit, Electronic Equipment TK-101/G
RELIMINARY PROCEDURE: Secure mounting brackets to vehicle.



EL8NZ145

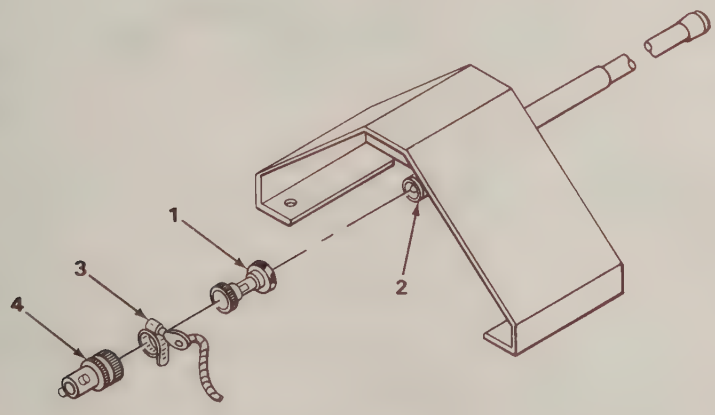
stallation of AB-15/GR

1. Place rubber washer (1) and upper insulator (2) over vehicle's antenna mount (3).
2. Place lower insulator (4), rubber washer (6) and ground ring (5) from underneath vehicle's antenna mount (3).
3. Hold lower insulator (4) while tightening upper insulator (2) until snug.

CAUTION

Do not overtighten insulator. Possible cracking can occur.

4. Tighten base body (7) with a wrench.

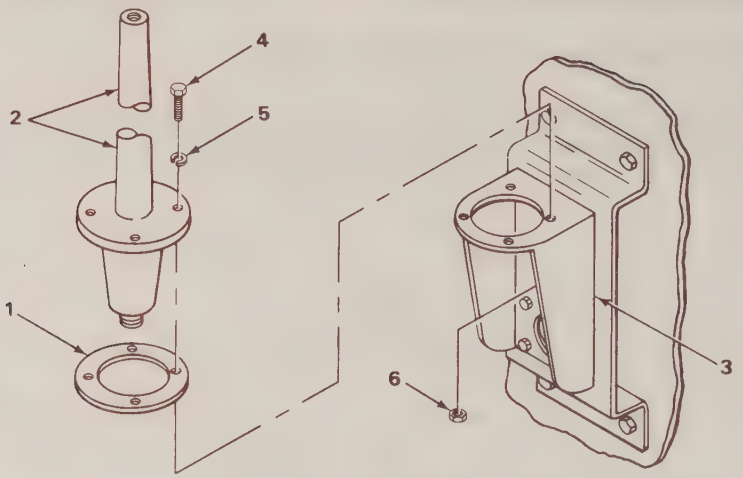


EL8NZ146

abling of AB-15/GR

1. Remove binding post (1) from jack (2) and discard.
2. Connect Adaptor UG-273/U (4) to jack (2).
3. Slide grounding clamp (3) around UG-273/U (4) and tighten.

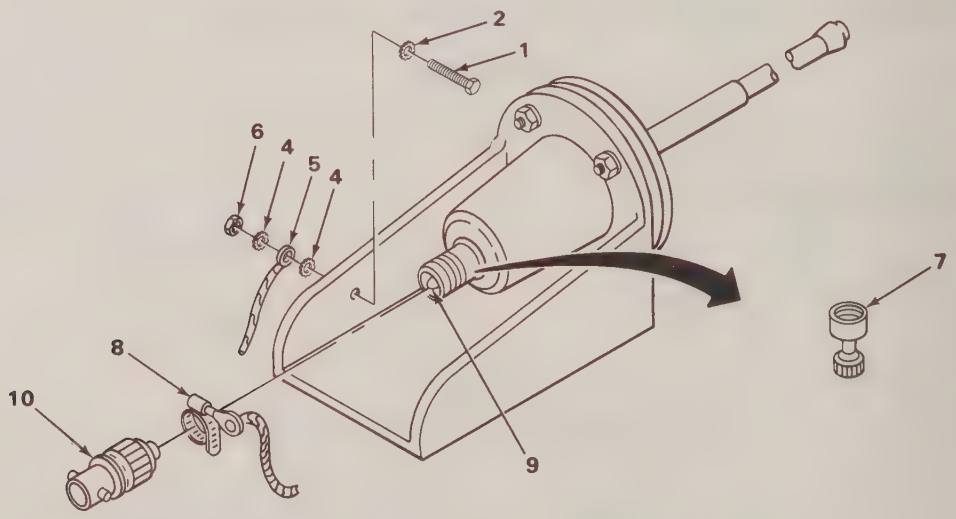
2-10. AUXILIARY RECEIVER ANTENNA. (CONT)



EL8NZ147

Installation of AB-558/GR

1. Place gasket (1) around AB-558/GR (2).
2. Place AB-558/GR (2) into mounting bracket (3).
3. Insert two bolts (4) and lockwashers (5) through AB-558/GR (2).
4. Place two nuts (6) on bolts (4) and tighten until snug.



EL8NZ148

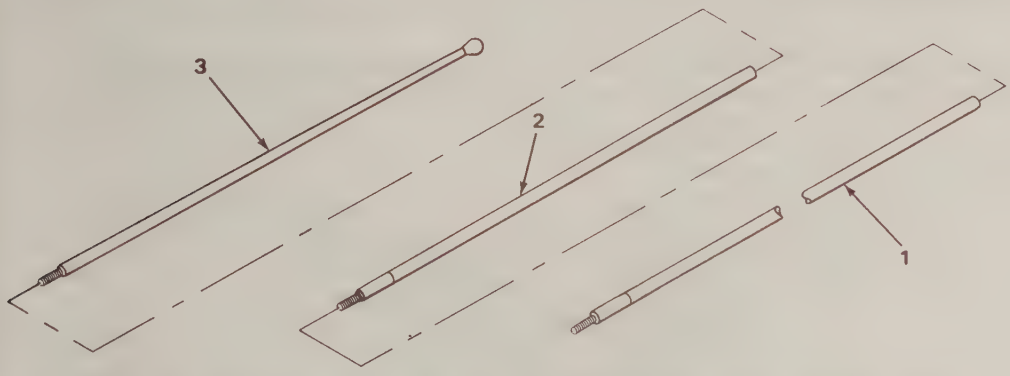
Cabling of AB-558/GR

1. Remove binding post assembly (7) and discard.
2. Connect Adaptor UG-273/U (10) to jack (9).
3. Place grounding clamp (8) on Adaptor UG-273/U (10) and tighten.
4. Insert screw (1) and star washer (2) through hole in mounting bracket (3).
5. Place first of two star washers (4), grounding lug (5), second star washer (4) and nut (6) on screw (1) and tighten.

-10. AUXILIARY RECEIVER ANTENNA. (CONT)

NSTALLATION OF UPPER ELEMENT MS-118 AND TIP CAP: See paragraph 2-9.

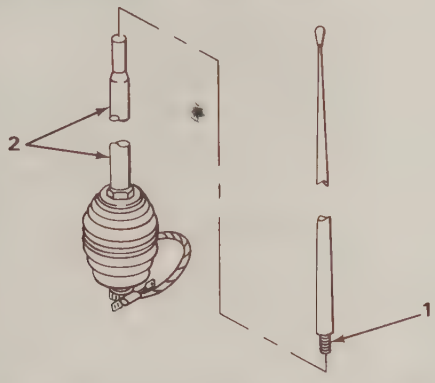
SSEMBLY OF ANTENNA ELEMENTS MS-116, MS-117, AND MS-118



EL8NZ074

1. Apply silicone compound (item 1, appendix C) to threads of upper element (1) and middle element (2).
2. Screw middle element (2) into lower element (3).
3. Screw upper element (1) into middle element (2) and lower element (3). Handtighten.

ECURING ASSEMBLED ANTENNA ELEMENT TO ANTENNA BASE



EL8NZ075

1. Apply silicone compound (item 1, appendix C) to threads of lower element (1).
2. Screw lower element (1) into antenna base (2).

IEDOWN PROCEDURE FOR AB-15/GR AND AB-558/GR

See tiedown procedure for AS-1729 and AT-912, paragraph 2-9.

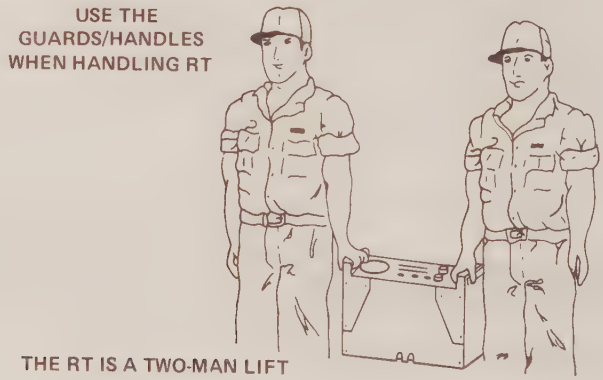
2-11. RECEIVER-TRANSMITTERS RT-524(*)/VRC AND RT-246(*)/VRC.

WARNING

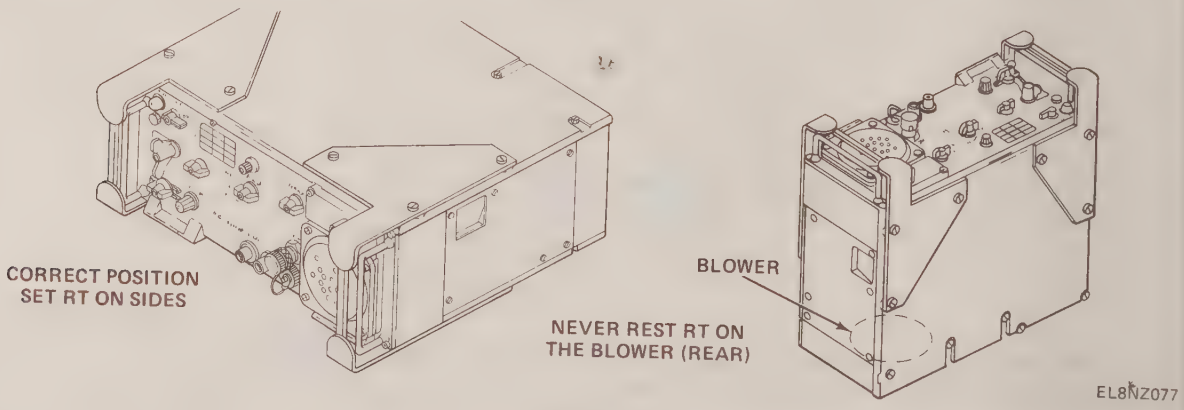
The receiver-transmitters are compact and heavy (over 60 lb). Be very careful when handling them. An object of such weight is considered a two-man lift.

Remove (turn off) power from a connector before removing or installing a cable. Connector pins may be **damaged** due to **arcing**. **Extreme electrical hazards** may exist that could cause **death.**

HANDLING RT-524/VRC AND RT-246/VRC



Use the guards/handles when handling RT.



CAUTION

Set the RT on any of its sides, except the rear of the unit. The blower assembly may be damaged by such things as stones, metal objects and mud lying on the ground or floor.

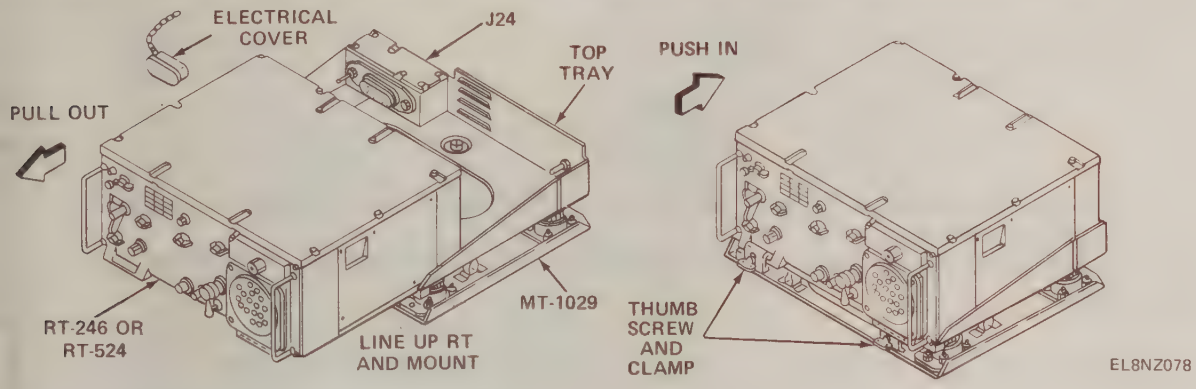
2-11. **RECEIVER-TRANSMITTERS RT-524/VRC AND RT-246/VRC.** (CONT)

CAUTION

Before installing (or removing) an RT from its mount, turn off the POWER switch on the RT. Plug/jack pins may be **damaged** due to **arcing**.

INSTALLATION OF RT-524/VRC OR RT-246/VRC

PRELIMINARY PROCEDURE: RT antenna must be installed and cabled. (See paragraph 2-15.)



INITIAL PROCEDURE: Remove electrical cover.

CAUTION

Before putting the RT on its MT-1029/VRC, clean mount's top tray. Remove the electrical cover from mount's jack (J24) and insure that it and its chain will not be in the way of the RT. Damage to the RT plug (P401) could occur.

NOTE

1. Lift RT. Set it on mount's top tray.
2. Line up back of RT with guide pins on mount's rear wall.
3. Push RT straight back into mount.

CAUTION

Be careful to keep RT flat on mount tray when sliding RT into (or out of) MT-1029/VRC. Damage to jack (J24) pins of the mount and RT plug (P401) will occur.

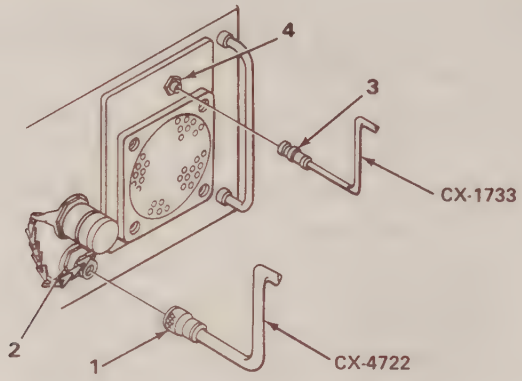
4. Lift up each clamp and tighten thumbscrews to lock RT to its mounting. Fingertighten.

CAUTION

When RT is removed from MT-1029/VRC, put the electrical connector cover on the radio jack (J24). Damage to the jack pins can occur.

2-11. RECEIVER-TRANSMITTERS RT-524(*)/VRC AND RT-246(*)/VRC. (CONT)

CABLING OF RT-524/VRC OR RT-246/VRC



EL8NZ184

1. Connect control cable (CX-4722) plug (1) to ANT CONT jack (2) of RT. Turn clockwise until plug locks into place.
2. Connect rf cable (CG-1773) plug (3) to ANT jack (4) of RT. Turn clockwise until plug locks into place.

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CX-4722	RT-524(*)/VRC or RT-246(*)/VRC	ANT CONT	P1	MX-2799 or MX-6707	J2 J551	P2 P2
CG-1773	RT-524(*)/VRC or RT-246(*)/VRC	ANT	P1	MX-2799 or MX-6707	J1 J552	P2 P2

NOTE

Cabling applies to A-RT of all AN/VRC-12 configurations. It also applies to C-RT of AN/VRC-45 and -49 configurations.

When RT to be operated is without speech-securing equipment, X-mode plug must be connected to RT's X-mode jack.

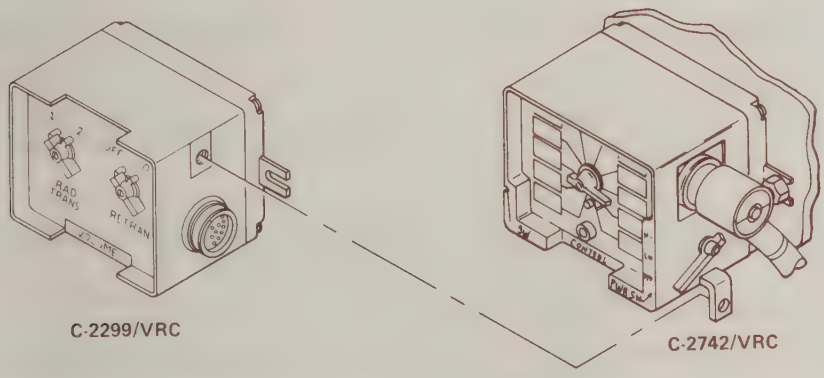
See paragraph 2-9 for cabling of RT antenna. See paragraph 1-14 for connecting audio accessories.

2. RADIO SET CONTROL C-2742/VRC.

CAUTION

Set RT-246 POWER to OFF. Turn to OFF all communications equipment. Serious arcing will occur, causing damage to connector pins.

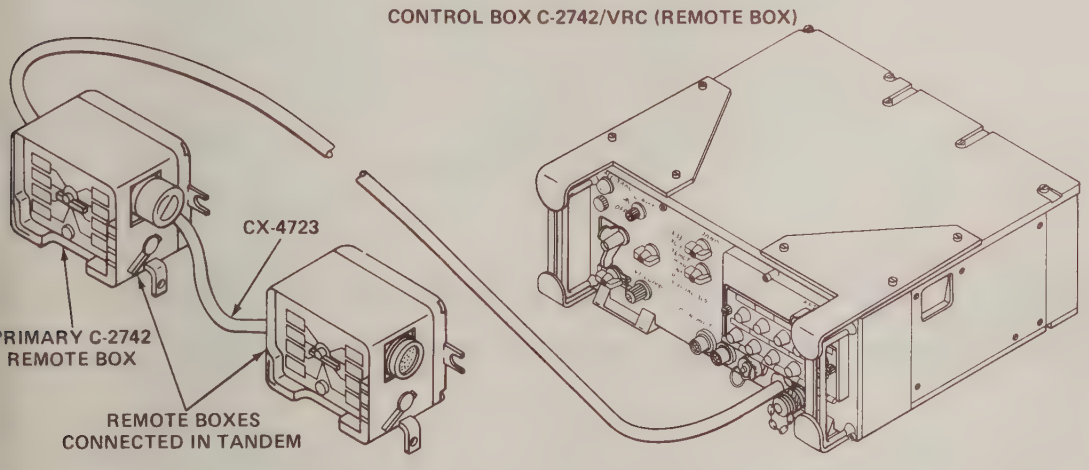
STALLATION OF C-2742/VRC



EL8NZ067

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. (If plug orientation is not correct, see paragraph 2-4 for detailed procedure.)
3. Lift and turn wingnut clockwise until plug is locked into jack. Fingertighten only.

NDEM INSTALLATION



EL8NZ068

2-12. RADIO SET CONTROL C-2742/VRC. (CONT)

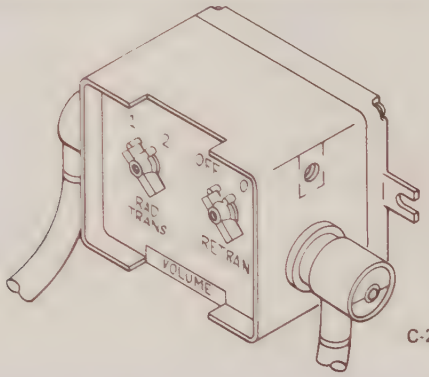
CABLING C-2742/VRC

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABL PLU
CX-7059/VRC	C-2742/VRC	J71	P2	RT-246 (AN/VRC-12, -43, -44, -45)	RE-MOTE	P1
CX-4723/VRC	Primary C-2742/VRC	J72		Tandem C-2742/VRC (AN/VRC-12, -43, -44, -45)	J71	

2-13. RADIO SET CONTROL C-2299/VRC.

WARNING

Turn off the vehicle engine. Turn off all radio equipment.



C-2299/VRC

EL8NZ06

1. Line up plug keyway with jack key.
2. Carefully turn plug until it drops into jack. (If plug orientation is not correct, see paragraph 2-4 for detailed procedure.)
3. Lift and turn wingnut clockwise until plug is locked into jack. Fingertighten only.

3. RADIO SET CONTROL C-2299/VRC. (CONT)

BLING C-2299/VRC

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
-4723/VRC	C-2299/VRC	J701		A-RT Mount MT-1029/VRC (AN/VRC-12, -43, -44, -45, -49)	J22	
-4723/VRC	C-2299/VRC	J702		C-RT Mount MT-1029 (AN/VRC-45, -49)	J22	

e paragraph 2-4 for typical cabling of C-2299/VRC.

2-14. AUX RECEIVER R-442(*)/VRC.

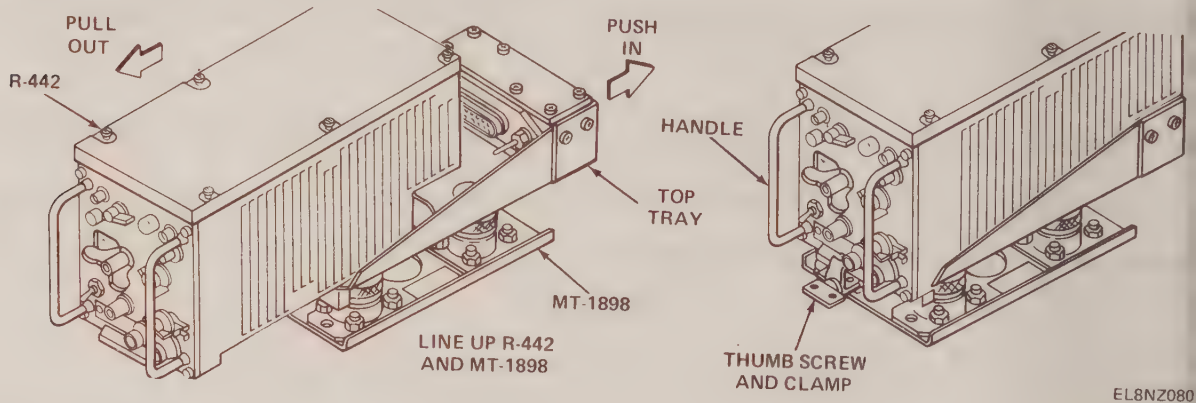
CAUTION

Turn off the vehicle power and radio equipment. Disconnect CX-4720/VRC from vehicle dc power outlet. Serious arcing will occur, causing damage to connector pins.

HANDLING R-442/VRC

Use the guards/handles when carrying the R-442/VRC.

INSTALLING AUXILIARY RECEIVER R-442/VRC



INITIAL PROCEDURE

Before putting the R-442 on the MT-1898, clean the MT-1898 top tray. Remove the electrical cover from the MT-1898 radio jack (J14) and insure that it and its chain are not in the way of the R-442. Inspect mount jack (J14) and R-442 plug (P201) and guide pins (e.g., bent, broken or missing pins).

TO INSTALL:

1. Lift R-442. Set it on mount's top tray.
2. Line up back of R-442 with guide pins on mount's rear wall.
3. Push R-442 straight back into mount.

CAUTION

Be careful to keep R-442 flat on mount's tray when sliding R-442 into (or out of) MT-1898/VRC. Damage to jack (J14) pins of the mount and R-442 plug (P201) will occur.

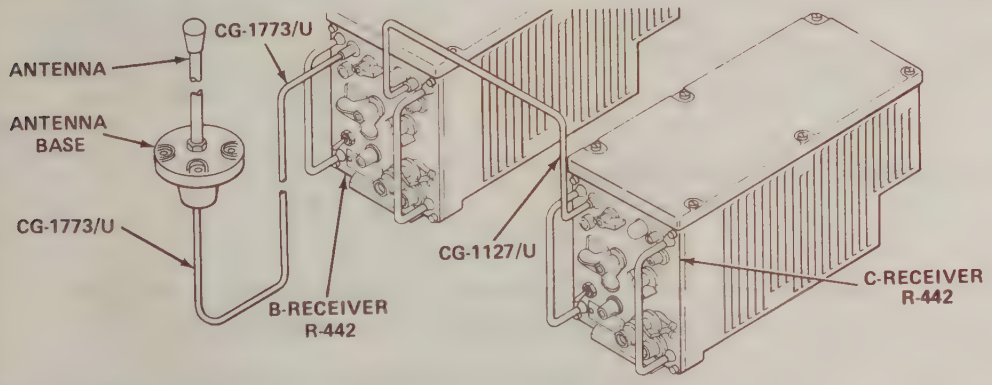
4. Lift up clamp and fingertighten the thumbscrew to lock R-442 to its mounting.

4. **AUX RECEIVER R-442 (*)/VRC.** (CONT)

CAUTION

When the R-442 is removed from the MT-1898/VRC, put the electrical connector cover on the radio jack (J14). Damage to the jack pins can occur.

BLING OF R-442: See paragraph 2-10 for cabling of auxiliary receiver antenna. Some tallations require the use of Adapter UG-306/U.



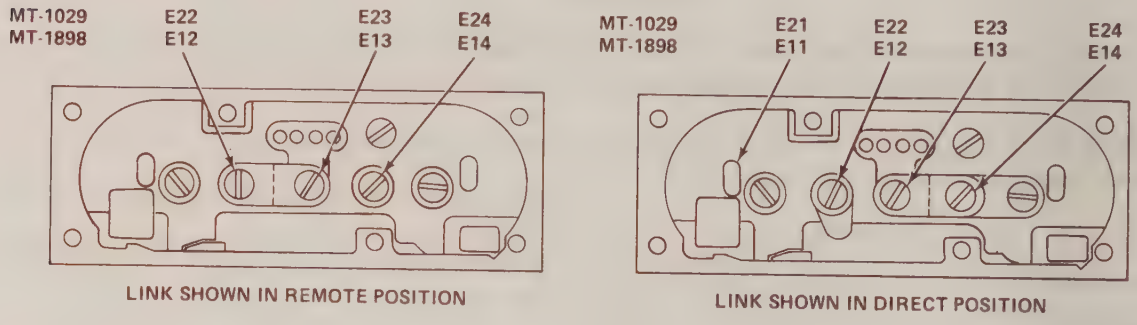
PICAL CABLING

r installations where there are two auxiliary receivers, the B- and C-receivers are coupled together d the auxiliary receiver antenna is connected to one of the receivers. Coupling is done by con- cting together the closest ANT jacks on the B- and C-receivers using Cable CG-1127/U. Plug P1 CG-1127/U is identical to P2 so either plug can be attached to either auxiliary receiver.

BLING - STANDARD

FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
G-1773/U	B-Receiver	ANT (Either)		Antenna Base AB-15/GR or AB-558/GR (AN/VRC -12, -47)		
G-1773/U	C-Receiver	ANT		Antenna Base AB-15/GR or AB-558/GR (AN/VRC -44, -48)		
G-1127/U	B-Receiver	ANT		C-Receiver (AN/VRC -44, -48)	ANT	

2-15. DETERMINING POSITION OF POWER CONTROL LINK OF A RADIO MOUNT.



EL8NZ052

PRELIMINARY PROCEDURE: Turn off vehicle engine.

VERIFICATION

1. Other than A-RT, in turn, set additional radio component POWER switches to ON (C-RT or C-R-442 and/or B-R-442). If additional radio component dial lamp lights, change link position from DIRECT to REMOTE.
2. Turn A-RT POWER switch to ON (LOW). If A-RT dial lamp lights, link position is in DIRECT.

NOTE

All radio component lamps should **now** light. If they do not, trouble exists within the system.

If all the lamps do not light, see chapter 3, section III, Troubleshooting.

2-16. DETERMINING POSITION OF X-MODE SWITCH OF AN RT.

NOTE

The following apply to **any** RT on any type of RT mount.

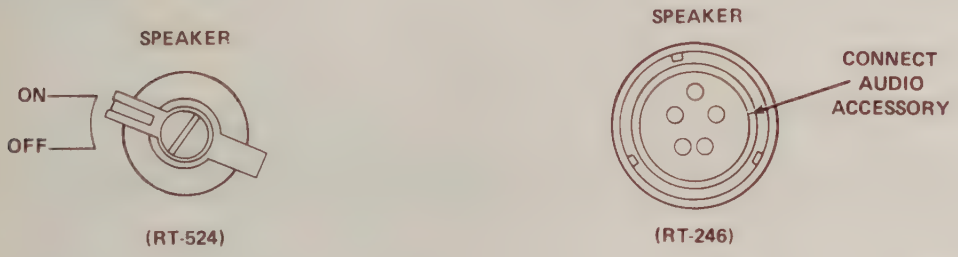
The X-MODE-NORMAL switch inside your RT should be in the X-MODE position for **both** NORMAL and X-MODE operation.

EL8NZ121

16. DETERMINING POSITION OF X-MODE SWITCH OF AN RT. (CONT)

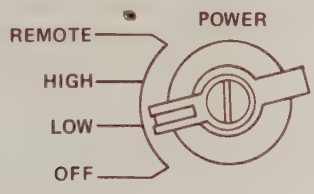
T X-MODE SWITCH CHECK

1. Turn SQUELCH switch to either OFF positions (NEW OFF or OLD OFF).
2. Turn VOLUME control to midrange position.
3. Turn LIGHT switch to ON.



EL8NZ122

4. For RT-524, turn SPEAKER switch to ON.
5. For RT-246, connect an audio accessory (headset, speaker, etc) to SPKR jack.



EL8NZ123

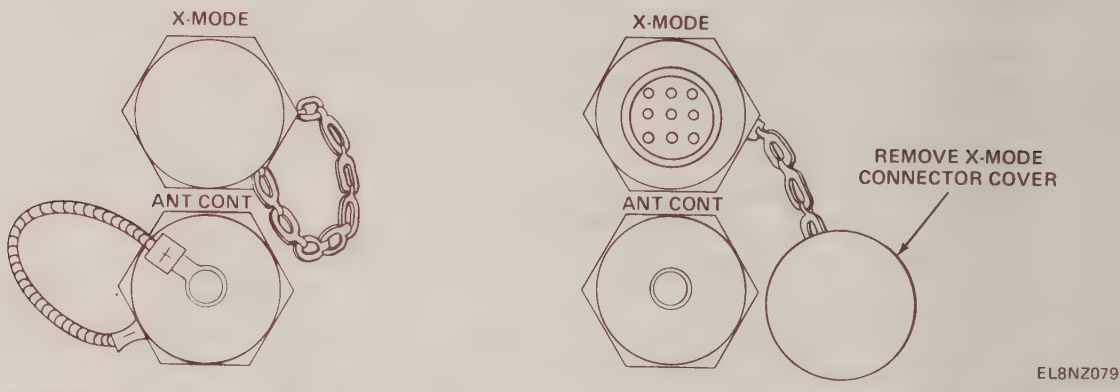
6. Turn POWER switch to LOW. You should hear a rushing noise (hissing sound).

NOTE

If there is no rushing noise, RT is defective. See chapter 3, section III, Troubleshooting.

2-16. DETERMINING POSITION OF X-MODE SWITCH OF AN RT. (CONT)

RT X-MODE SWITCH CHECK (CONT)



7. Remove X-MODE plug from RT X-MODE jack (**or** unplug Vinson cable from RT X-MODE jack). Rushing noise should disappear.

NOTE

If rushing noise does not disappear, the RT internal X-MODE switch is probably in the NORMAL position. See paragraph 3-16, for changing X-MODE switch position.

8. Replace X-MODE switch (or Vinson cable). Rushing noise should reappear. If the noise does not reappear, see chapter 3, section III, Troubleshooting.

2-17. DETERMINING POSITION OF X-MODE SWITCH OF R-442.

NOTE

When any aux receiver is installed in a Vinson aux receiver mount, the internal X-MODE-NORMAL switch **must** be in the X-MODE position.

When any aux receiver is installed on a regular aux receiver mount, the internal X-MODE-NORMAL switch **must** be in the NORMAL position.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Subject	Section	Page
Repair Parts, Special Tools, TMDE and Support Equipment	I	3-1
Organizational Preventive Maintenance Checks and Services (PMCS)	II	3-2
Troubleshooting	III	3-13
Maintenance Procedures	IV	3-87
Preparation for Storage or Shipment	V	3-176

OVERVIEW

This chapter contains information concerning maintenance for the AN/VRC-12 series radio sets at the organizational maintenance level. Troubleshooting is done on a radio set installed in a wheeled vehicle. Organizational maintenance procedures are provided for individual components of the radio set. When similar maintenance is done for more than one component, those components are grouped together.

Section I REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

Subject	Para	Page
Common Tools and Equipment	3-1	3-1
Special Tools, TMDE and Support Equipment	3-2	3-1
Repair Parts	3-3	3-2

3-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the table that is applicable to your unit:

Modified Table of Organization and Equipment (MTOE)
Tables of Distribution and Allowances (TDA)
Joint Tables of Allowances (JTA)
Common Tables of Allowances (CTA)

3-2. SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT.

Tools, test equipment (TMDE) and support equipment are listed in the Maintenance Allocation Chart (MAC), appendix B.

3-3. REPAIR PARTS.

Repair parts needed for organizational maintenance can be found in the following manual:

TM 11-5820-401-20P	AN/VRC-12 series radio set components: RT 524(*)/VRC, RT 246(*)/VRC, RCVR 442 (*)/VRC, RT Antennas, Auxiliary RCVR Antennas, Mountings 1029/VRC and 1898/VRC, Controls C-2299 and C-2742. Spare Parts and Special Tools List

Section II ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Subject	Para	Page
General	3-4	3-2
Organizational Maintenance Level Preventive Maintenance Checks and Services (PMCS)	3-5	3-3
Cleaning and Touchup Painting	3-6	3-12

3-4. GENERAL.

As specified in this section, Preventive Maintenance Checks and Services (PMCS) are done to:

1. Spot small radio set problems and correct them before they cause serious problems.
2. Keep the radio equipment in good physical condition.
3. Insure that each component is functioning properly, both as an individual component and with other components of the radio set as installed.

Organizational maintenance level PMCS for radio sets are normally done on a monthly and quarterly basis as scheduled on DD Form 314, Preventive Maintenance Schedule and Record. Your supervisor will establish a Monthly and Quarterly PMCS schedule (DD Form 314) for each wheeled vehicle that has a radio set, but this PMCS may be done on a more frequent basis as directed by your supervisor.

Monthly (M) PMCS would be scheduled, for example: 12 January, 12 February, 12 March, etc. Quarterly (Q) PMCS, done every three months, would be scheduled, for example: 12 January, 12 April, 12 July, etc. The organizational level checks and services are listed in paragraph 3-5.

A record of any faults found during periodic PMCS and the corrective actions taken should be maintained on DA Form 2404, Equipment Inspection and Maintenance Worksheet.

A faulty item of equipment that cannot be repaired at the organizational maintenance level will be sent to the next higher level of maintenance, accompanied by a DA Form 2407, Maintenance Request.

NOTE

Complete instructions for the use, completion and disposition of maintenance forms and records are contained in TM 38-750, The Army Maintenance Management System (TAMMS).

5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

rganizational level PMCS for C-E equipment are done to insure that your unit's radio equipment is i top operating condition. A comprehensive PMCS program reduces equipment downtime and icreases your unit's operational readiness.

ome PMCS are considered to be routine and should be done anytime you see that they need to be one. For some items of equipment, routine PMCS are not listed in the PMCS table. Routine PMCS iat are listed in the PMCS table are there because others have reported unusual or significant roblems with a particular item of equipment.

ome routine PMCS would include the following:

1. Check and insure that the vehicle's radio set as installed is complete. Refer to TM 11-5820-401-10-2-HR for examples of hand receipts where end item listings can be used to inventory the equipment.

CAUTION

Use only clear water and a rag to clean plastic surfaces. Do not paint plastic surface. Damage to plastic will result if cleaned with solvent, or painted.

2. Check equipment surfaces for corrosion, rust and fungus. Clean and touch up paint as appropriate. General procedures are contained in paragraph 3-6.

3. Check the controls of components to insure that knobs are not missing, broken or loose, and that controls turn properly. Detailed instructions for replacing control knobs are in chapter 3, section IV.

4. Check for loose plugs and jacks. Tighten cable plug lockrings and cable restraining devices (glands). If a plug has an O-ring, check and insure that it is properly installed and lubricated. Tighten component jack lockrings.

5. Check plug-to-jack connections and insure proper plug orientation and tightness of connections. See chapter 2, section III for cable installation and orientation of plugs and cables.

6. Check for loose mountings, hardware, brackets, etc. Tighten as appropriate. Replacement procedures for the specific item of equipment are contained in chapter 3, section IV.

WARNING

Insure that the correct type of bolts or screws, star washers and nuts are used and properly assembled. Severe electrical hazards exist when items of equipment are not properly installed and grounded.

7. Check for bent or missing mounting guides and connector pins. All unused jacks must have protective (dust) covers installed. Refer to TM 11-5820-401-10-1 for typical cabling diagrams that will assist in identifying unused jacks of a specific wheeled vehicle's radio set.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (CONT)

8. Check cables for fraying, cuts, cracks, dry rot, or other damage and fix or replace as appropriate. Check for improperly routed cables. Refer to an appropriate 2300 series installation manual for cable routing instructions.

NOTE

Before doing the PMCS listed below, check and insure that all current Modification Work Orders (MWO's) for the specific radio set have been accomplished. DA Pam 310-1, Consolidated Index of Army Publications and Blank Forms (microfiche), paragraph 82, contains a listing of current MWO's for communications-electronics equipment.

1. As a minimum, the ● in the INTERVAL column indicates when a check and service should be done, as follows: M-Monthly, and Q-Quarterly.

2. The numbers in the ITEM NO. column show the order in which the check or service should be done. These numbers should be used when recording deficiencies and shortcomings on DA Form 2404.

3. Perform routine preventive maintenance as required when inspecting each item.

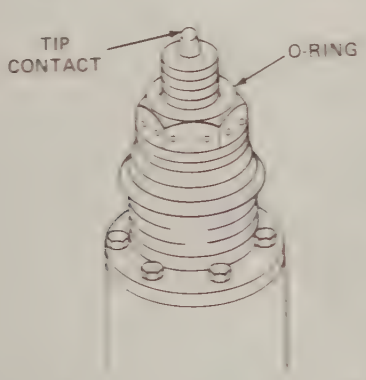
M-MONTHLY Q-QUARTERLY

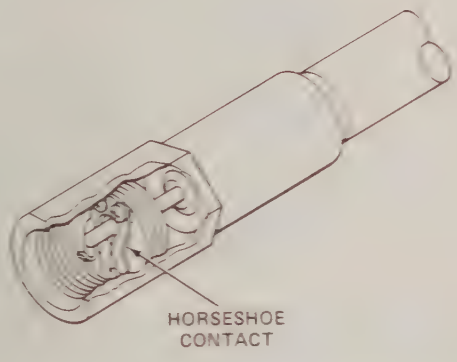
ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
			ANTENNA (RT and Aux RCVR)	**WARNING** Do not transmit on the RT while handling the antenna.
1		●	Elements	Check antenna elements for damage (e.g., split or shortened 6 or more inches, stripped threads, etc). Replace damaged elements. (See paragraph 3-18.)
2		●	Element Threads	Clean and lubricate threads. (Use silicone compound, item 1, appendix C.)

ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
3		•	Element Contacts RT Antenna	





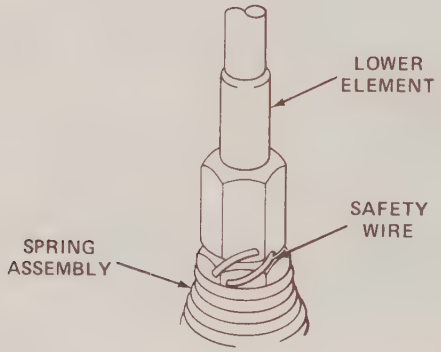
ELEN

	Check that tip contact sticks up from the top of the spring assembly about 1/8 inch. Check that it is not loose and O-ring is in place. Adjust contact. (See paragraph 2-9.) Check that horseshoe contact inside bore of lower element is not broken or missing. Replace if broken or missing. (See paragraph 2-9.)

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
4	•		O-Ring and Safety Wire	



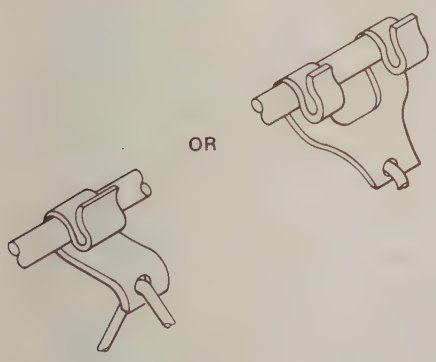
EL8NZ129

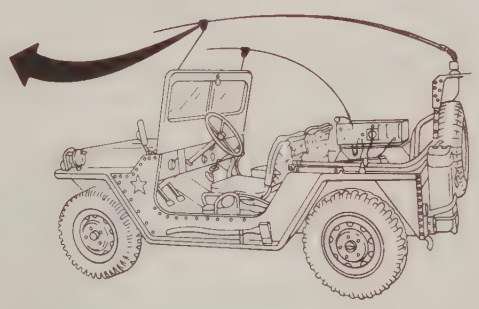
				Check that O-ring on threaded portion of spring assembly can not be seen when lower element is in place. If seen, see paragraph 2-9. Check that safety wire is in place to secure lower element to spring assembly. Install wire if missing or broken. (See paragraph 2-9.) **CAUTION** Do not overtighten lower element to spring assembly or you may damage contacts.

5. **ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECK AND SERVICES (PMCS).** (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
5	•		Ground Strap AS-1729/VRC Aux RCVR	Check that ground strap is securely connected. Secure or replace if frayed or damaged. (See paragraph 2-9.) **WARNING** Severe electrical hazard exists if equipment is not securely grounded.
6	•		Tip Cap AS-1729/VRC AT-912/VRC Aux RCVR	Check for cracked, loose or missing tip cap. Replace cracked tip cap and secure to top antenna element. (See paragraph 2-9.)
7	•		Tiedown AS-1729/VRC AT-912/VRC Aux RCVR	Check that the tiedown rope is connected to the proper place on the vehicle and adjusted to tie the antenna whip down between a 30° and 45° angle to keep tip cap about 9 feet above ground. (See paragraph 2-9.)





EL8NZ130

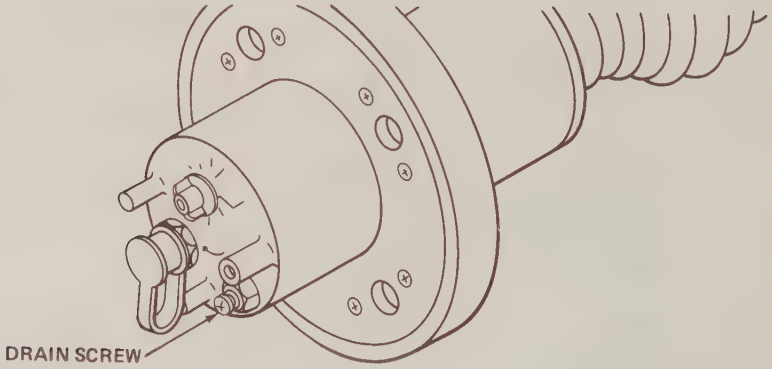
CAUTION

Insure that tip will not swing beyond the side of the vehicle.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (CONT)

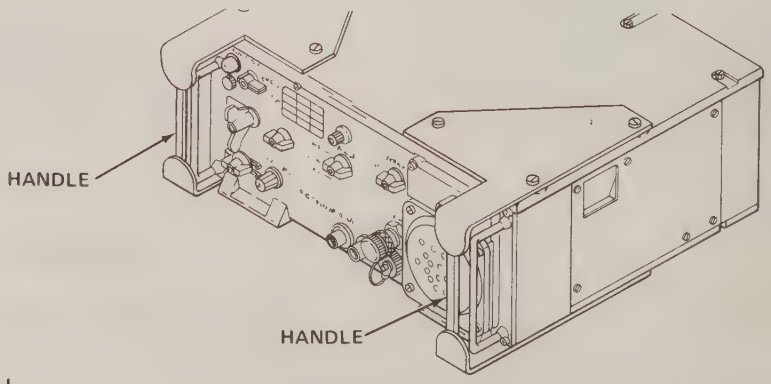
M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
8	●		Water Drain Matching Unit MX-6707 Only	



EL8NZ131

			RT-524(*)/VRC and/or RT-246(*)/VRC	Drain all water trapped inside the matching unit.
9	●		Handles	



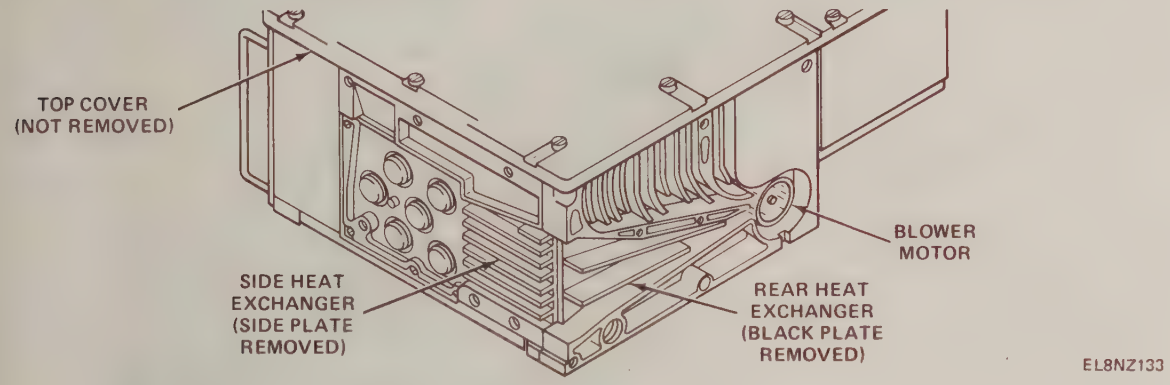
EL8NZ132

				Check that all plain models of RT have handles over front panel guards. Install if missing. (See paragraph 3-16.)

5. **ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).** (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
10		●	Heat Exchanger	



Clean heat exchanger with a stiff bristle brush to remove hard dirt and a soft bristle brush to remove loose dirt. See paragraph 3-16.

CAUTION

On early model RT mountings, a special vent cover is provided. This vent cover must be installed when RT is in operation.

NOTE

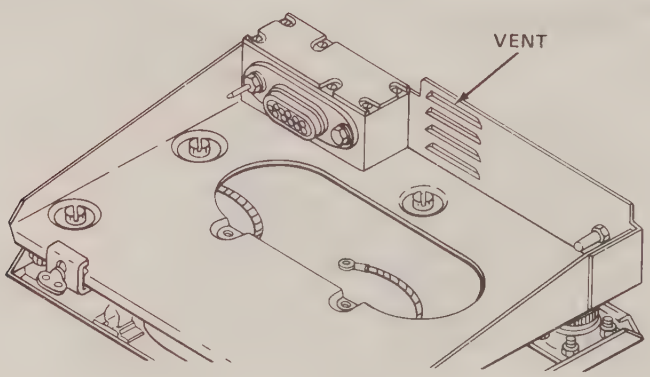
To prevent dirt from entering inside RT, do **not** remove top and bottom covers.

In dusty areas such as deserts, cleaning may be required monthly or weekly.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (CONT)

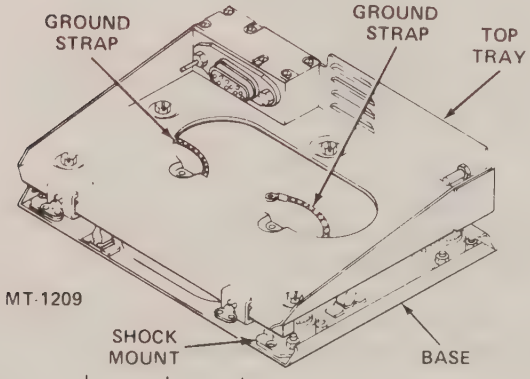
M-MONTHLY Q-QUARTERLY

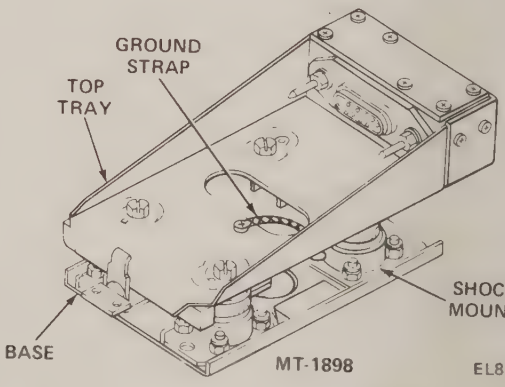
ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE



EL8NZ134

			MOUNTINGS 1029/VRC 1898/VRC	Clean vent on Mounting MT-1029/VRC when RT is removed for cleaning of heat exchanger.





EL8NZ135

11		•	Ground Strap	Check ground strap between mounting base assembly and top tray for proper connection. Replace if frayed or damaged. (See paragraph 2-9.)

NOTE

MT-1029 mounts produced after 1972 have only one ground strap.

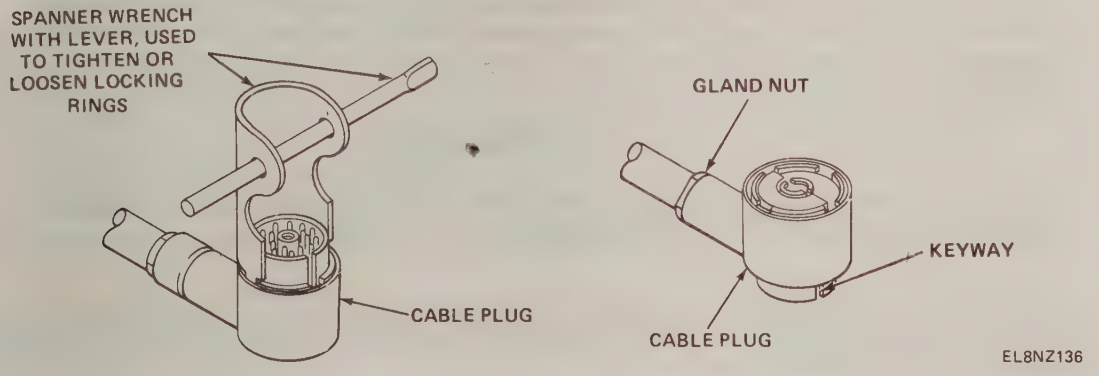
WARNING

Severe electrical hazard exists if equipment is not properly grounded.

5. **ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).** (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
12		•	Shock (Resilient) Mounts	Check that top tray is secured to base assembly. If loose, replace broken resilient mount. (See paragraph 3-19.) **NOTE** MT-1029 has five shock mounts; MT-1898 has four.
			RADIO SET	
13		•	Cable Connections	



				Check that cable plug and component jack lockrings are tight to prevent twisting of cables and possible damage to equipment internal wiring. Tighten with spanner wrench. Tighten loose cable restraint's (gland) nut. **CAUTION** Do **not** attempt to change cable orientation by rotating loose equipment jacks. Damage to internal wiring could occur. Change cable orientation by loosening locknuts on cable plugs and rotating position of keyway on plug.

3-5. ORGANIZATIONAL MAINTENANCE LEVEL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (CONT)

M-MONTHLY Q-QUARTERLY

ITEM NO.	INTERVAL M	INTERVAL Q	ITEM TO BE INSPECTED	PROCEDURE
14		•	Communications System	Do the operational check procedures to check communications system performance and combat readiness. See paragraph 3-13 for procedures.

3-6. CLEANING AND TOUCHUP PAINTING.

WARNING

TRICHLOROTRIFLUOROETHANE

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves and an apron which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

CAUTION

Use only clear water and a rag to clean plastic surfaces. Do not paint a plastic surface. Damage to plastic will result if cleaned with solvents or painted.

Equipment should be kept free of dirt, grease, rust, fungus, and corrosion. Clean and dust the outside surfaces frequently with a lint-free cloth dampened with cleaning compound (item 6, appendix C) **except** antenna matching units.

Clean the plastic body of antenna matching units with clear water. Inspect plastic body for hairline cracks.

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to applicable painting and refinishing instructions given in SB 11-5 73 and TB 43-0118.

NOTE

Heat-reflecting paint should be applied to the receiver-transmitters and aux receivers that are used in open vehicles that are continually exposed to the sun. This paint requires special application procedures and should be referred to a higher level of maintenance.

Section III TROUBLESHOOTING

Subject	Para	Page
eneral	3-7	3-13
pes of Problems	3-8	3-14
oubleshooting Procedures	3-9	3-14
planation of Symbols and Notes	3-10	3-15
lecting Proper Flow Chart	3-11	3-16
oubleshooting Flow Charts	3-12	3-18

7. GENERAL.

his section provides the techniques and procedures (troubleshooting methods) that are used to oubleshoot a wheeled vehicle's radio set and identify a bad item of equipment.

roubleshooting methods for typical radio sets are presented in the form of flow charts. These flow harts are used to systematically get from the symptoms of trouble to the actual bad item of equipment y specifying only essential information.

he troubleshooting flow charts provided in this section are based on the AN/VRC-12 series radio sets ormally installed in M151 1/4-ton general-purpose utility vehicles and M882 1 1/4-ton trucks. roubleshooting can be done on any other wheeled vehicle radio set configuration by using the ethods presented by the flow charts and allowing for variations of installed equipment.

ROUBLESHOOTING

roubleshooting is done on a faulty (non-operational) radio set to identify and then repair the item of quipment causing the radio set to be non-operational. Troubleshooting is not done on an operational adio set. To determine if troubleshooting is required, the suspected radio set first should be valuated using the operational check procedure provided in chapter 3, section IV. If symptoms of rouble are observed when doing the operational check procedure, troubleshooting should be nitiated. Based on the observed symptoms of trouble, troubleshooting for any radio set consists of our basic steps.

1. Interpret the symptoms of trouble as to a circuit of the radio set that, when bad, would cause the problem. For example:

   The RT's antenna matching unit does not tune when the RT's MC-TUNE-KC controls are changed from 67.05 to 62.20 MHz denotes that the control circuit between the RT and its antenna matching unit is bad.

2. For the determined bad circuit, analyze and interpret an appropriate circuit diagram as to:

   a. All items of equipment involved in the circuit's operation.

   b. How the circuit is intended to work (operate).

   c. Type of problem encountered. (See paragraph 3-8.)

3-7. GENERAL. (CONT)

NOTE

Circuit diagrams for the individual circuits of a typical radio set are provided as foldouts at the rear of this manual. Principles of operation of the various circuits of a typical radio set are provided in chapter 1, section III.

3. Based on the results of 2 above, again analyze the faulty circuit's diagram as to the best troubleshooting approach (t/s method) to include appropriate t/s techniques and a procedure.

   a. Examples of t/s techniques include voltage tracing, circuit disturbing, continuity checking, and circuit substituting.

   b. A t/s procedure means to establish, by test points, the sequential order the t/s techniques should be done to obtain valid conclusions.

4. Based on the results of 3 above, apply the t/s method within the radio set's faulty circuit to the point where the actual bad item of equipment is identified.

After troubleshooting has identified the actual bad item of equipment, repair that item of equipment by fixing its problem or replacing the item with a good item of the same type. After a repair action has been accomplished, again evaluate the operation of the radio set to see if the repair is effective and that no other faults exist.

3-8. TYPES OF PROBLEMS.

Problems within a radio set can normally be cataloged as to an adverse open or an adverse short. If, when doing the operational check, a function:

1. Does not occur when it should, an item of equipment within the affected circuit probably contains an adverse open.

2. Occurs before it should, an item of equipment within the affected circuit probably contains an adverse short.

Determining the type of problem before troubleshooting a bad circuit will speed up the troubleshooting process in that the best troubleshooting method can be more easily determined.

3-9. TROUBLESHOOTING PROCEDURES.

The troubleshooting flow charts of this section are based on the four steps of troubleshooting presented in paragraph 3-7. Based on the observed symptoms of trouble, each chart presents an easy-to-follow procedure, including specific troubleshooting techniques that, when followed, will identify the faulty item of equipment.

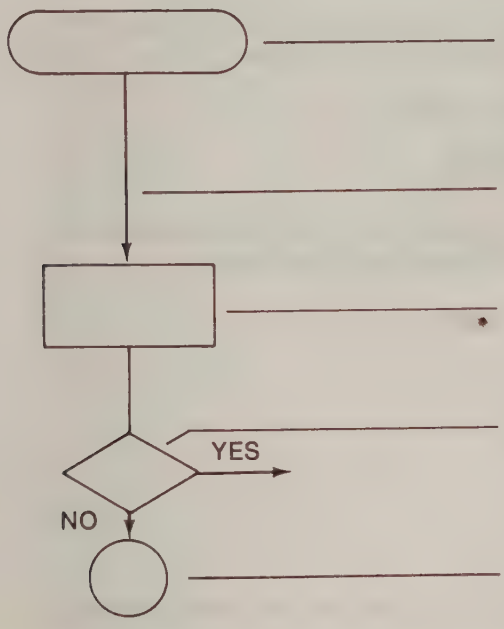
9. **TROUBLESHOOTING PROCEDURES.** (CONT)

NOTE

The troubleshooting procedure will isolate only one fault at a time. After the fault has been found and corrected, repeat the operational check to see if the repair corrected the problem and then to see if there are any additional faults.

When using a particular flow chart procedure, follow along on the appropriate circuit diagram. Note 1 of each chart will reference a specific circuit diagram and the circuit diagrams are provided as foldouts (FO) at the rear of this manual.

10. **EXPLANATION OF SYMBOLS AND NOTES.**

SYMBOL	EXPLANATION
	Test Procedure Start: (Rectangle with rounded corners) Indicates start of the test procedure and contains a brief description of the symptom of trouble.
	Test Procedure Flow Line: (Heavy line and arrowhead) Indicates direction of the procedure flow.
	Test Procedure Instruction: (Rectangle) Provides instructions for doing a specific test (t/s technique).
	Decision: (Diamond) Indicates that a decision must be made (YES or NO) in answer to a question about the previous test. Path taken depends on the answer (YES or NO).
	Connector: (Circle) Directs user to an entry point of another chart. Contains an entry number (#) that is same as entry number of other chart and a sheet number (Sh #) that indicates the number of follow-on pages.
NOTES	Notes Column: Presents additional critical information, such as: more specific instructions about how to do a test, **cautions** and **warnings** that must be observed when doing a test, and additional information about what to do after doing a test. Also provides references to appropriate circuit diagrams.

3-11. SELECTING PROPER FLOW CHART.

Selecting the proper flow chart is dependent upon the symptoms of trouble observed when doing a particular step of the operational check. The operational check procedure is provided at chapter 3, section IV. When abnormal indications are observed as the result of doing the actions specified for a particular step, that step will either state the faulty item of equipment or will reference a specific troubleshooting flow chart. Simply follow the direction of the operational check step to get to the correct troubleshooting chart.

HOW TO USE A FLOW CHART

After selecting a proper flow chart as described in paragraph 3-11, proceed as follows:

1. Do the actions described in the first rectangle.
2. Answer YES or NO to the question asked in the diamond that follows the first rectangle.
3. Go to the next step as directed by the answer to the YES/NO question.
4. Do additional steps as required, and directed, until the actual bad item of equipment is identified, and then follow the repair instruction presented in that box.
5. Repeat operational check after each repair is completed.

WARNING

To guard against electrical shock, remove or tape exposed personal metal objects (e.g., watches, rings, medallions) before doing the procedure of any flow chart.

Within the flow charts, special symbols are used. They are:

1. Ω for ohms (measure of resistance).
2. ∞ for infinity (a number too high to express).
3. > for greater than.
4. < for less than.

Other important conditions and actions that pertain to the procedure of any flow chart are:

1. Before starting a procedure, the controls and cabling of the items of equipment of the radio set being checked must be as they were when the symptoms of trouble were observed.
2. Unless otherwise stated, all voltage measurements, resistance measurements, and circuit disturbance checks are to be made with respect to chassis ground (bare metal).

11. **SELECTING PROPER FLOW CHART.** (CONT)

3. To circuit disturb, set up the multimeter as an ohmmeter (Rx10 range). For detailed procedures on circuit disturbing an audio accessory, see paragraph 3-14.

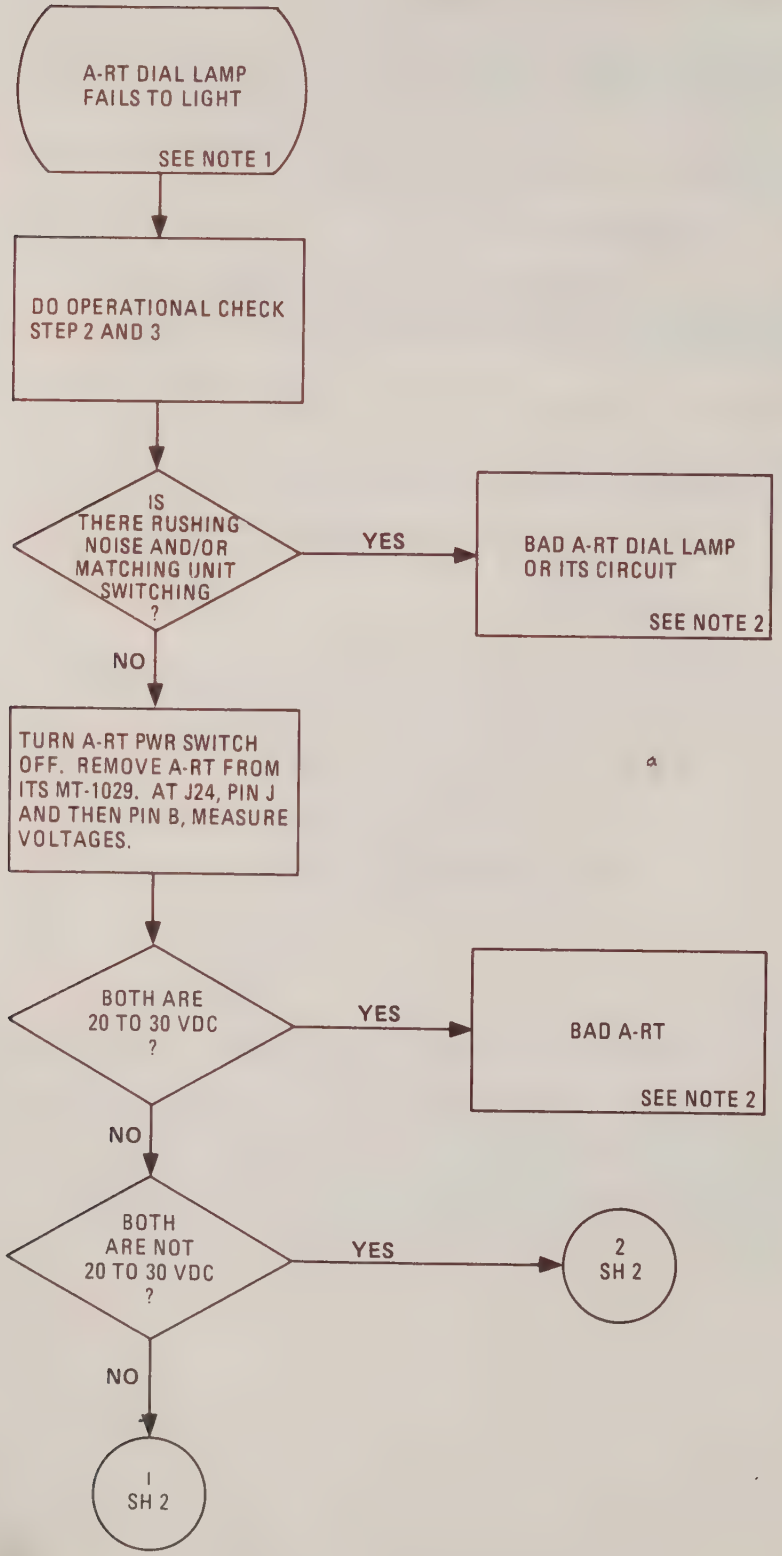
4. To measure an ac talk-signal, set up the multimeter as an ac voltmeter (lowest range unless otherwise specified) and then connect the meter probes between the specified test point and chassis ground. Next, key the mike and note the meter reading. Finally, sharply whistle into the keyed mike and look to see if the meter reading changes. Any change of the ac voltage reading indicates the presence of the talk-signal.

CAUTION

To guard against equipment damage when making measurements or circuit disturbing with power applied, make sure the proper pins of the specified test point are used (selected) and that the meter probes do not touch.

3-12. TROUBLESHOOTING FLOW CHARTS.

CHART 1
Troubleshoot Power Input Circuit (Sheet 1 of 3)


A-RT DIAL LAMP FAILS TO LIGHT
SEE NOTE 1
DO OPERATIONAL CHECK STEP 2 AND 3
IS THERE RUSHING NOISE AND/OR MATCHING UNIT SWITCHING ?
YES
BAD A-RT DIAL LAMP OR ITS CIRCUIT
SEE NOTE 2
NO
TURN A-RT PWR SWITCH OFF. REMOVE A-RT FROM ITS MT-1029. AT J24, PIN J AND THEN PIN B, MEASURE VOLTAGES.
BOTH ARE 20 TO 30 VDC ?
YES
BAD A-RT
SEE NOTE 2
NO
BOTH ARE NOT 20 TO 30 VDC ?
YES
2
SH 2
NO
1
SH 2

NOTES

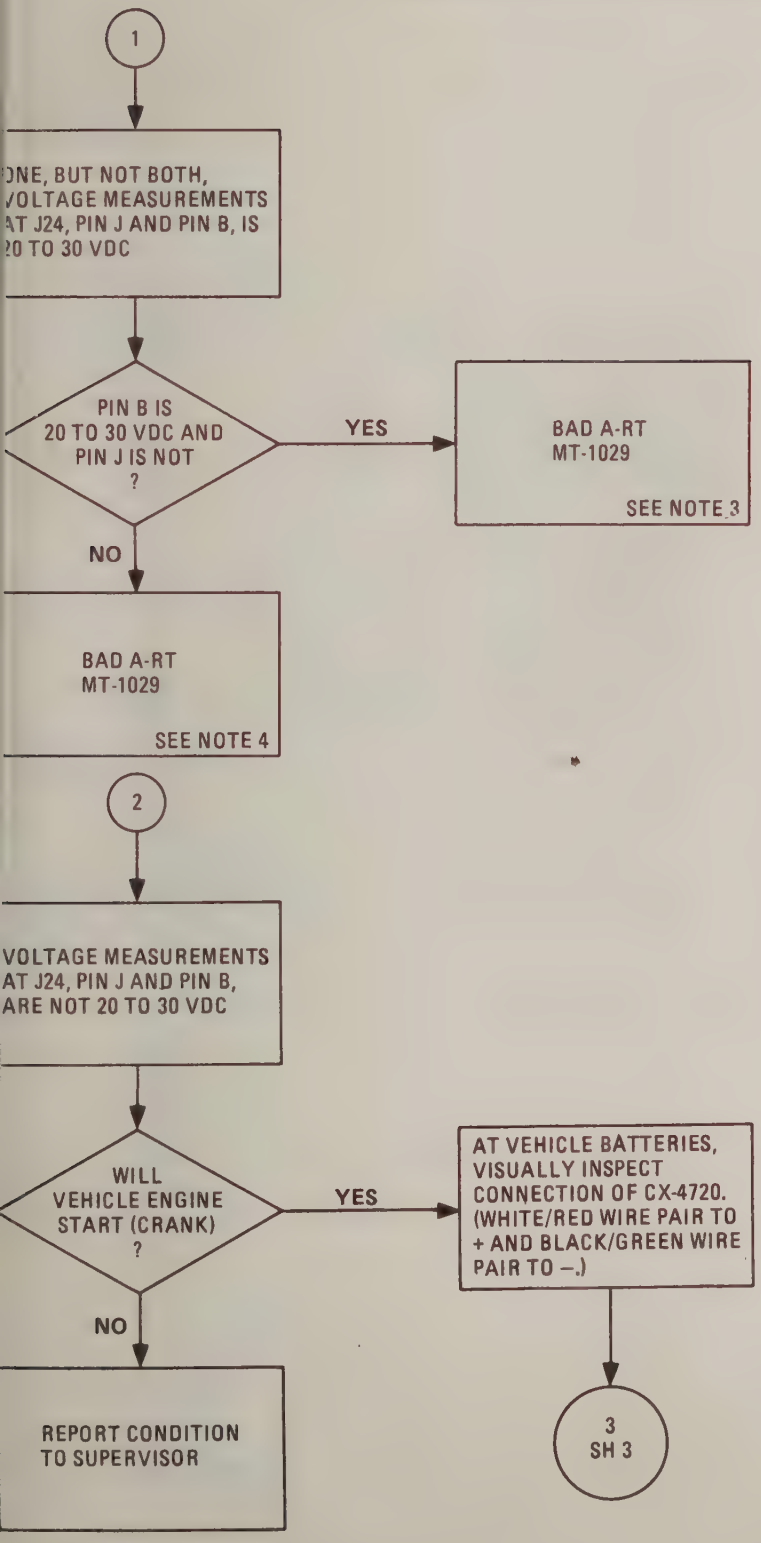
1. This chart is used to troubleshoot the power input in a wheeled vehicle in which the primar power cable (CX-4720) is directly connected t the vehicle batteries. Refer to FO-1 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Inside J-box, check position of link and wiring from E24 to pin J of J24. Replace mount if not repairable.
4. Inside J-box, check wiring from E24 to pin B of J24. Replace mount if not repairable.
5. Check J-box fuse 1. Check wiring inside J-box from J21, pin A to J24, pin A, then from J21, pin B to J24, pin B and J. Replace mount if not repairable.

NOTE

Mounts produced after 1972 do not have a fuse.

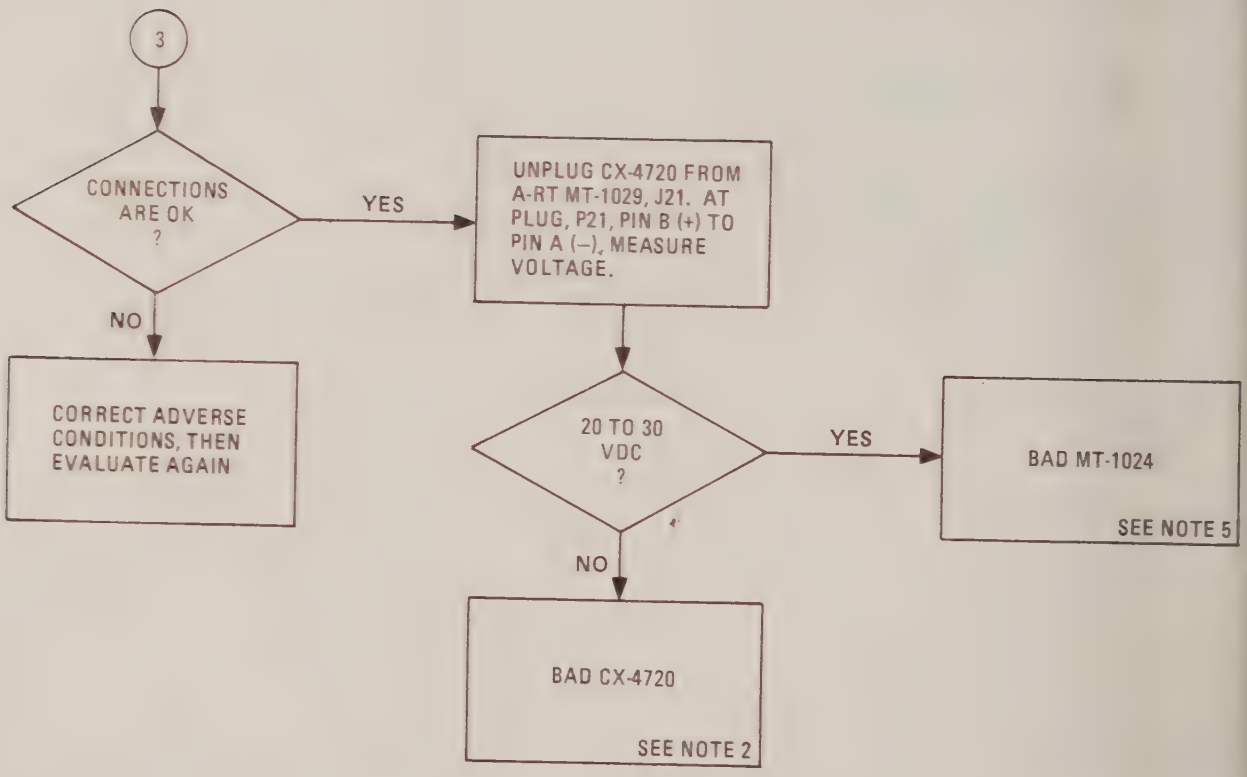
12. **TROUBLESHOOTING FLOW CHARTS.** (CONT)

CHART 1
Troubleshoot Power Input Circuit (Sheet 2 of 3)


1
ONE, BUT NOT BOTH, VOLTAGE MEASUREMENTS AT J24, PIN J AND PIN B, IS 20 TO 30 VDC
PIN B IS 20 TO 30 VDC AND PIN J IS NOT ?
YES
BAD A-RT MT-1029
SEE NOTE 3
NO
BAD A-RT MT-1029
SEE NOTE 4
2
VOLTAGE MEASUREMENTS AT J24, PIN J AND PIN B, ARE NOT 20 TO 30 VDC
WILL VEHICLE ENGINE START (CRANK) ?
YES
AT VEHICLE BATTERIES, VISUALLY INSPECT CONNECTION OF CX-4720. (WHITE/RED WIRE PAIR TO + AND BLACK/GREEN WIRE PAIR TO –.)
3
SH 3
NO
REPORT CONDITION TO SUPERVISOR

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

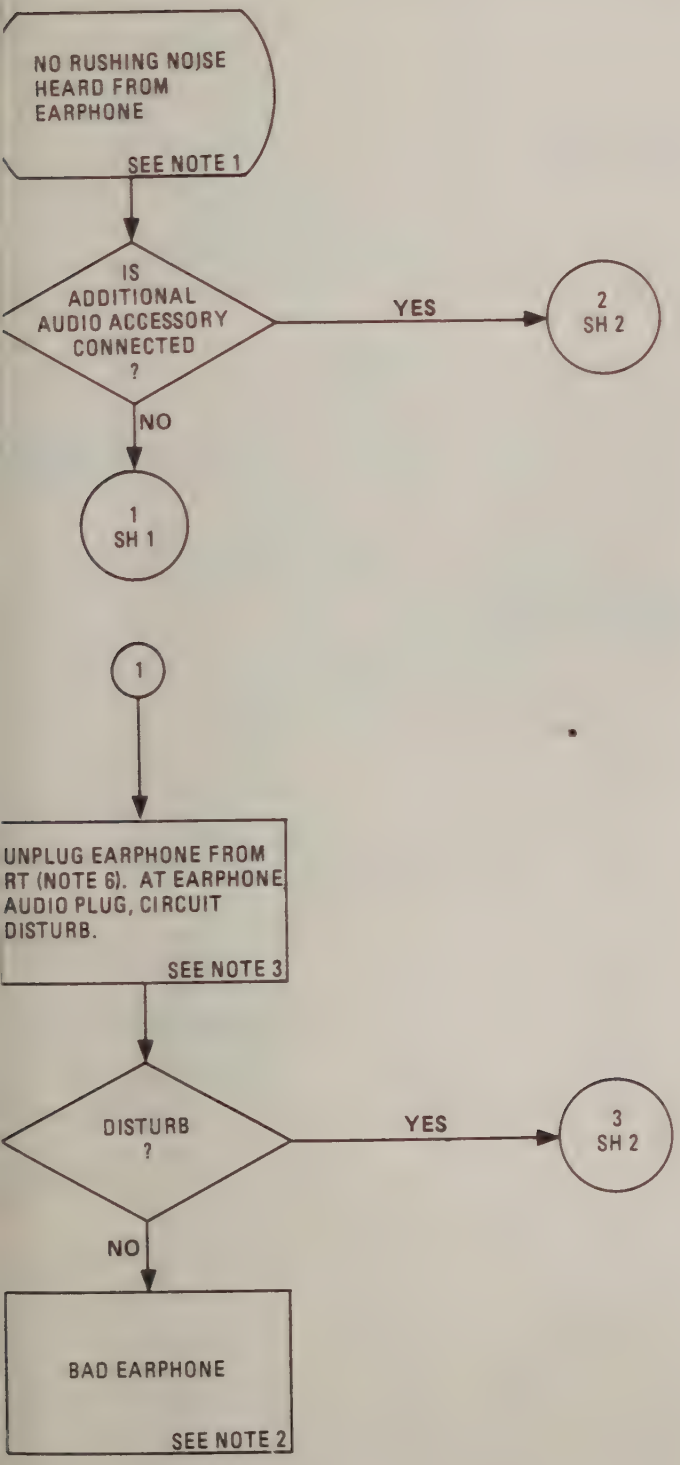
CHART 1
Troubleshoot Power Input Circuit (Sheet 3 of 3)



12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 2

Troubleshoot RT's Earphone Audio Circuit (Sheet 1 of 3)

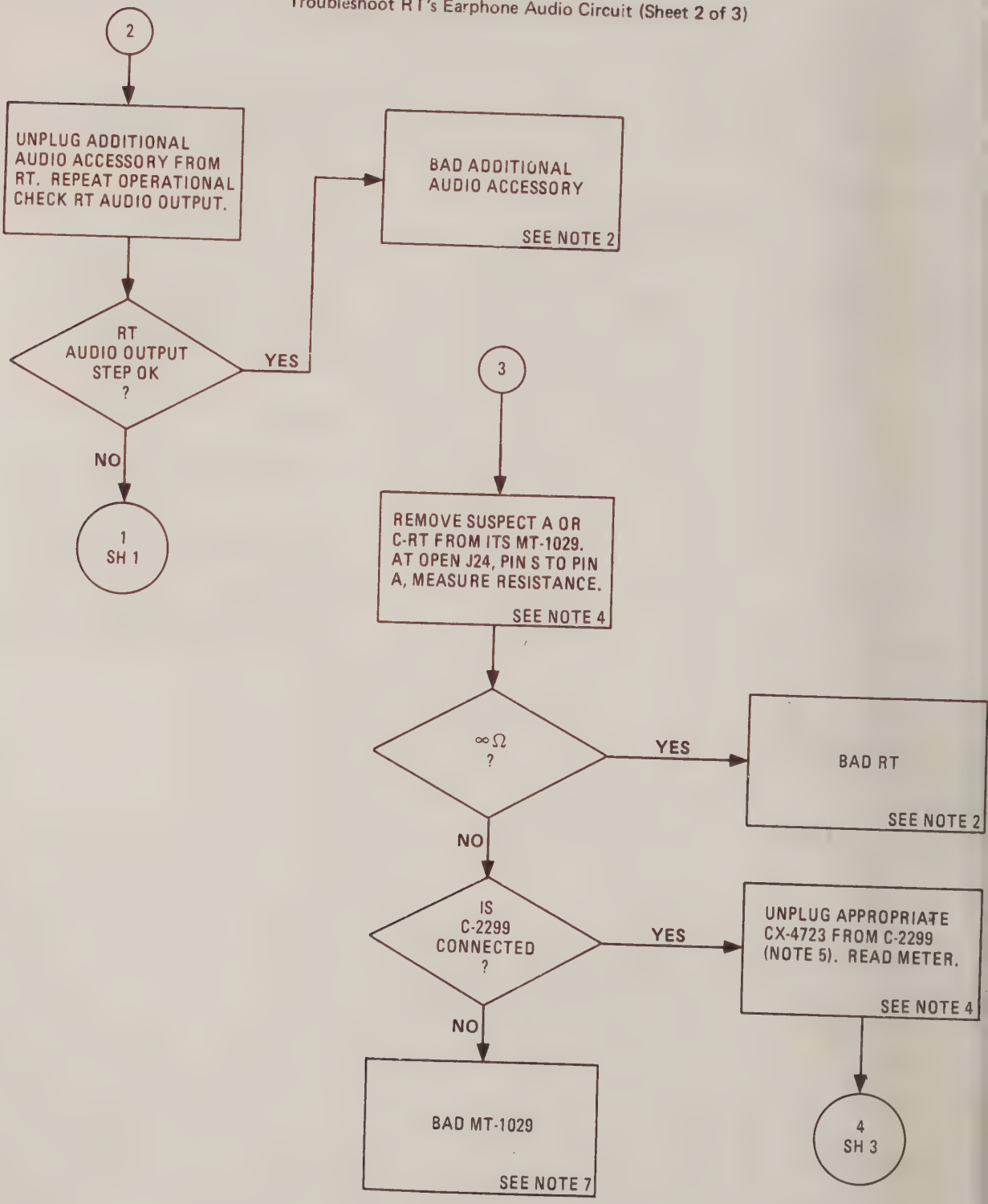


NOTES

1. This chart is used to troubleshoot either the A-RT or C-RT earphone audio output circuit. Refer to FO-1 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. To test an earphone circuit, set up the multimeter as an ohmmeter, RX10, then circuit disturb at the audio accessory plug. Connect one lead to pin A, then tap pin B with the other lead while listening to the earphone for a clicking sound.
4. Leave meter connected to MT-1029, J24 for further tests.
5. For adverse A-RT, unplug CX-4723 from J701; for adverse C-RT, unplug CX-4723 from J702.
6. Make sure that audio plug and jack controls are clean and a serviceable O-ring is correctly installed.
7. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if repairable.

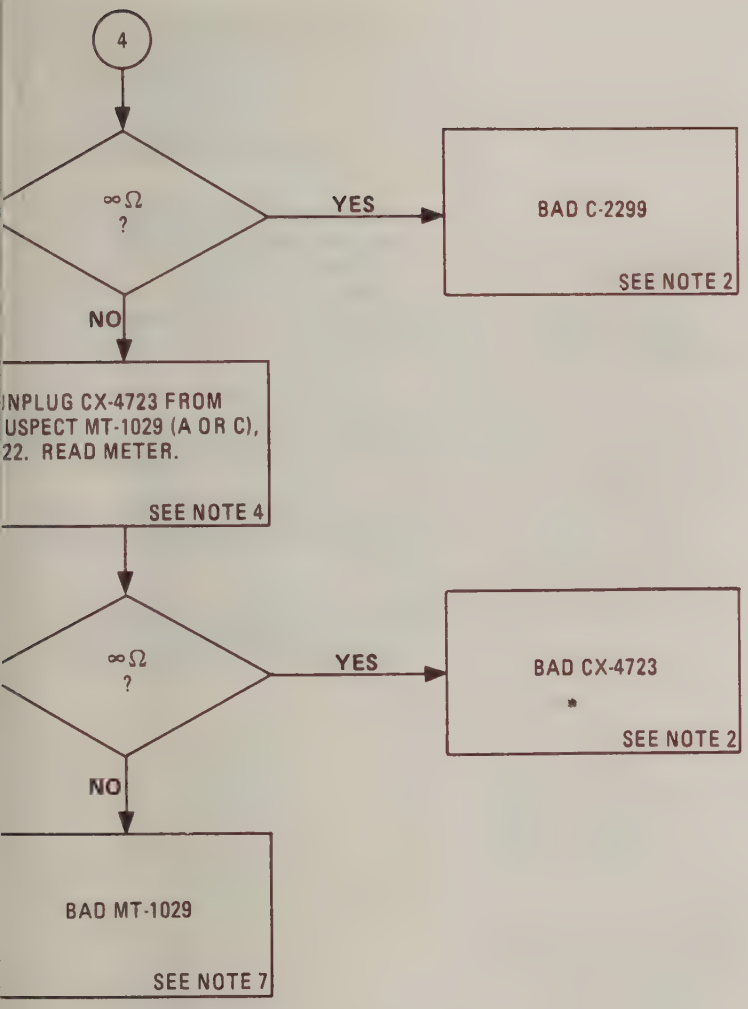
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 2
Troubleshoot RT's Earphone Audio Circuit (Sheet 2 of 3)



2. TROUBLESHOOTING FLOW CHARTS. (CONT)

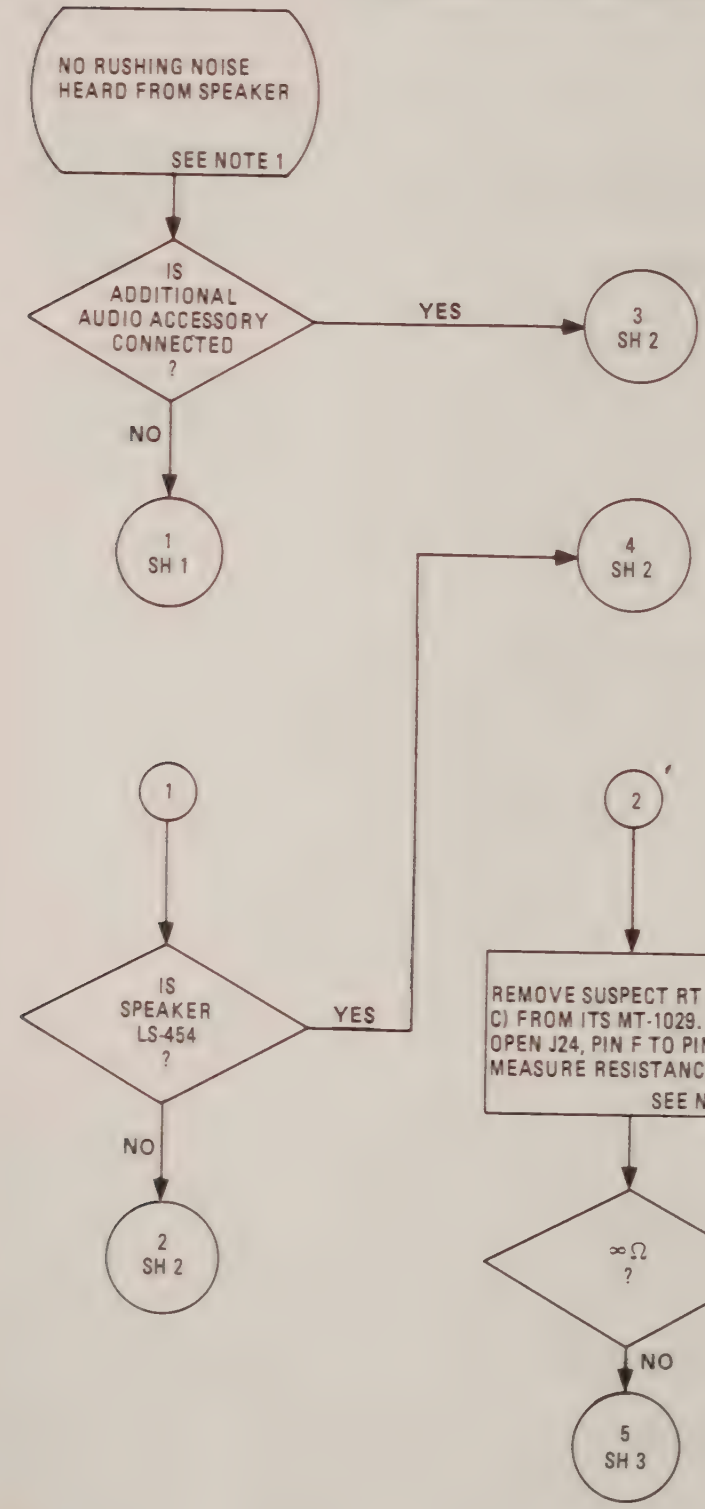
CHART 2
Troubleshoot RT's Earphone Audio Circuit (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 3

Troubleshoot RT's Speaker Audio Circuit (Sheet 1 of 3)

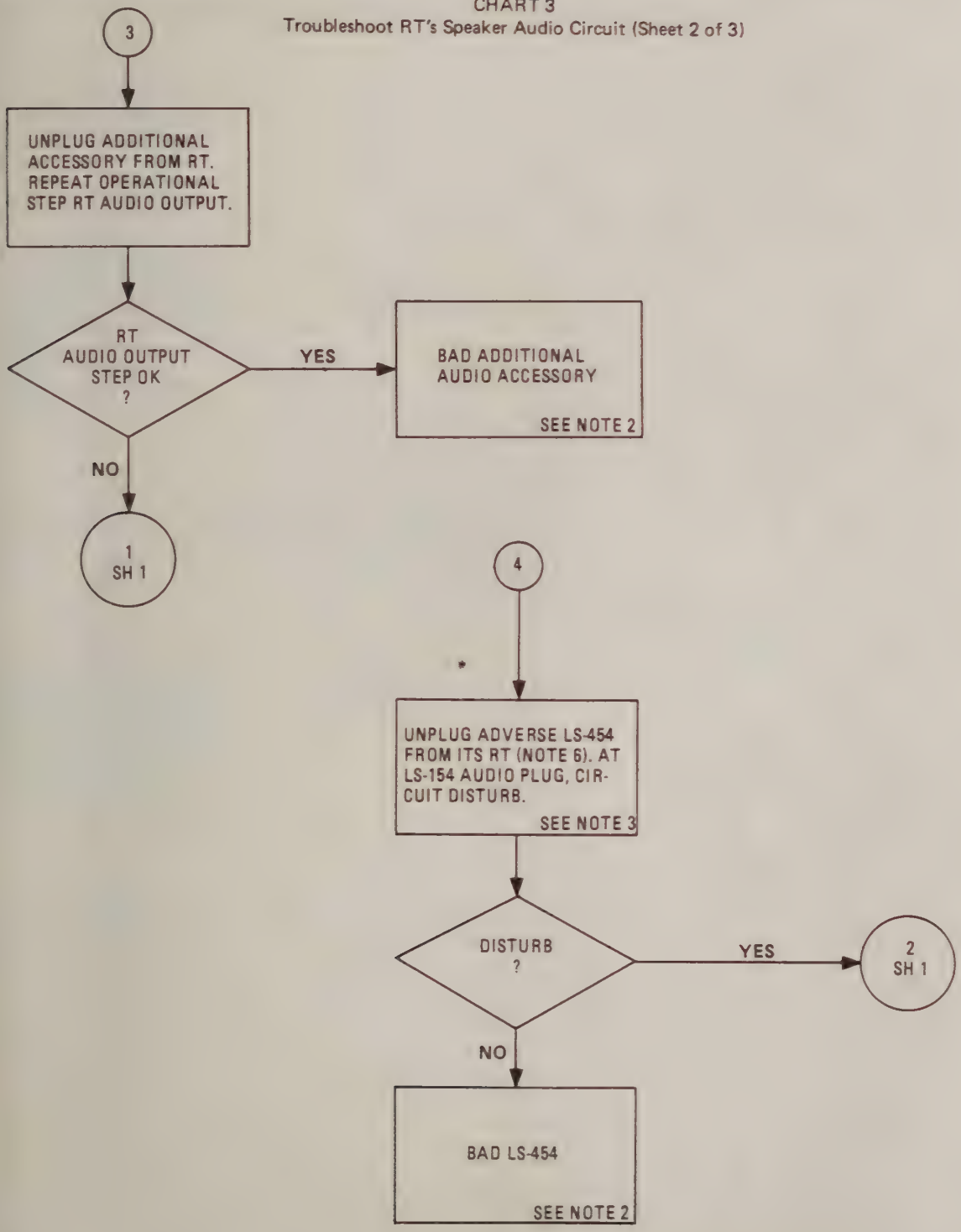


NOTES

1. This chart is used to troubleshoot either the A-RT or C-RT speaker audio output circuit. Refer to FO-1 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. To test a speaker circuit, set up the multimeter as an ohmmeter, RX10, then circuit disturb at the audio accessory plug. Connect one lead to pin A, then tap pin E with the other lead while listening to the speaker for a clicking sound.
4. Leave meter connected for further tests.
5. For adverse A-RT, unplug CX-4723 from J701; for C-RT, unplug CX-4723 from J702.
6. Make sure that audio plug and jack contacts are clean and a serviceable O-ring is correctly installed.
7. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

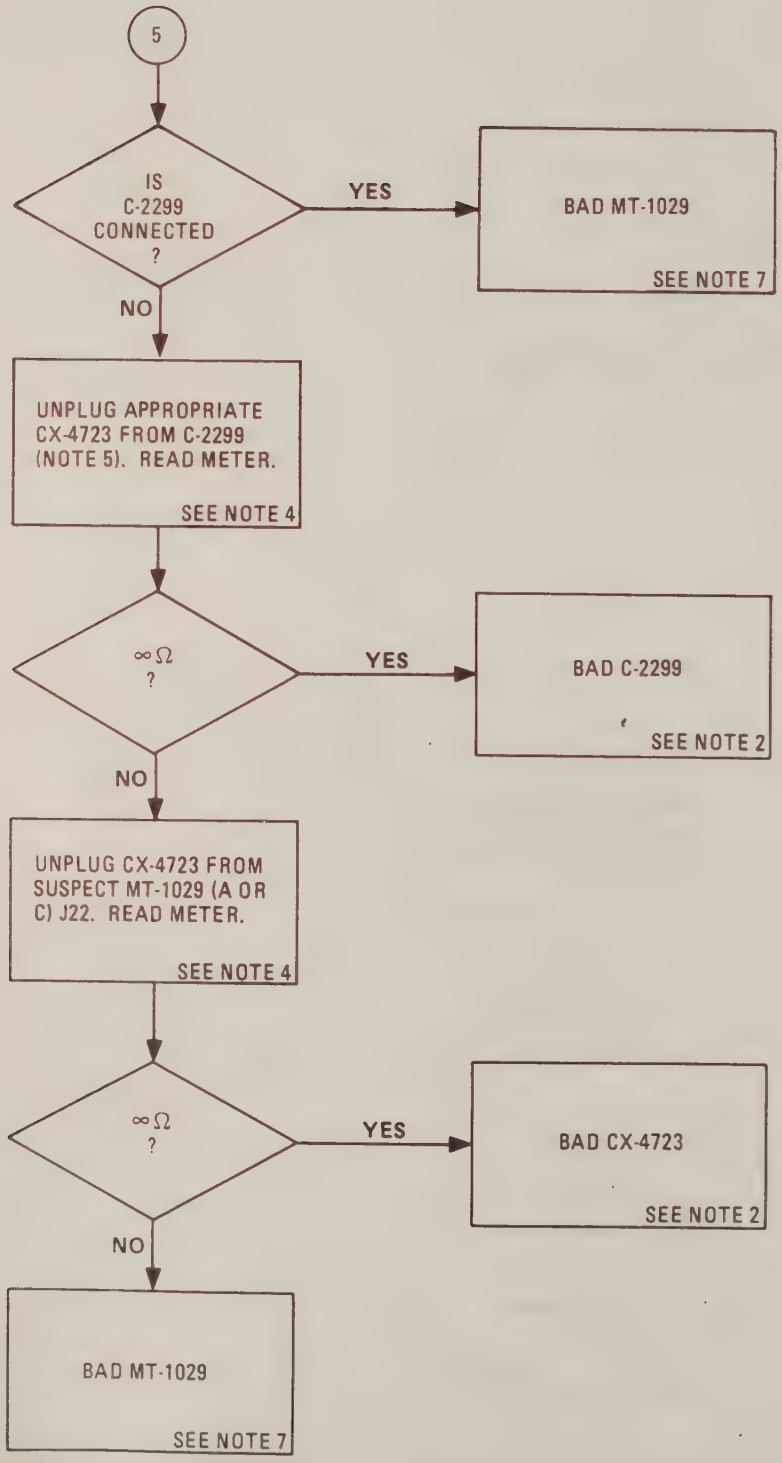
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 3
Troubleshoot RT's Speaker Audio Circuit (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

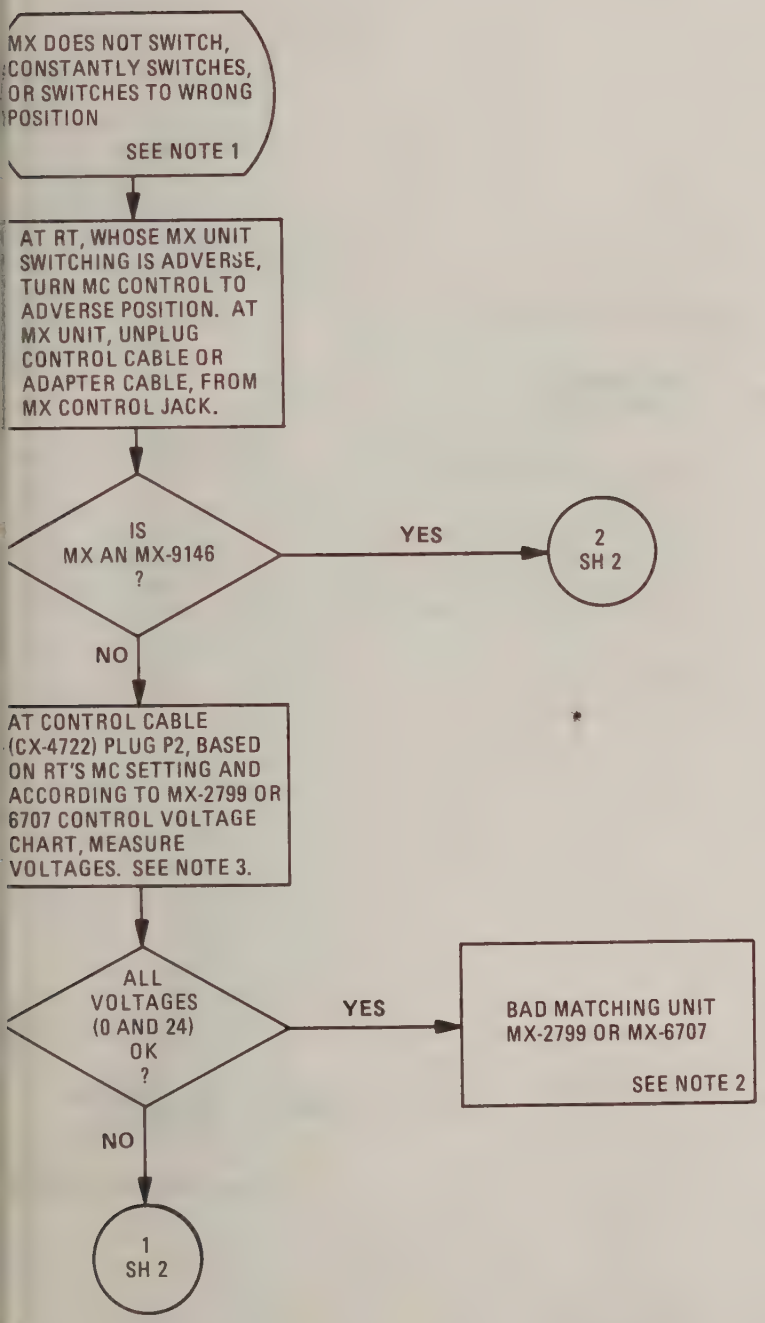
CHART 3
Troubleshoot RT's Speaker Audio Circuit (Sheet 3 of 3)



2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 4

Troubleshoot RT Antenna Matching (MX) Unit Control Circuit (Sheet 1 of 3)


MX DOES NOT SWITCH, CONSTANTLY SWITCHES, OR SWITCHES TO WRONG POSITION
SEE NOTE 1
AT RT, WHOSE MX UNIT SWITCHING IS ADVERSE, TURN MC CONTROL TO ADVERSE POSITION. AT MX UNIT, UNPLUG CONTROL CABLE OR ADAPTER CABLE, FROM MX CONTROL JACK.
IS MX AN MX-9146 ?
YES
2 SH 2
NO
AT CONTROL CABLE (CX-4722) PLUG P2, BASED ON RT'S MC SETTING AND ACCORDING TO MX-2799 OR 6707 CONTROL VOLTAGE CHART, MEASURE VOLTAGES. SEE NOTE 3.
ALL VOLTAGES (0 AND 24) OK ?
YES
BAD MATCHING UNIT MX-2799 OR MX-6707
SEE NOTE 2
NO
1 SH 2

NOTES

1. Refer to FO-1 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Matching unit control voltage chart for MX-2799 and MX-6707. Control cable is CX-4722.

MX-2799 OR 6707

FREQ MHZ	BAND	PIN DESIGNATION							
		N	A	B	D	E	F	H	J
30–33	LOW	24	24	0	24	0	0	0	0
33–37	LOW	24	24	0	0	24	0	0	0
37–42	LOW	24	24	0	0	0	24	0	0
42–47.5	LOW	24	24	0	0	0	0	24	0
47.5–53	LOW	24	24	0	0	0	0	0	24
53–56	HIGH	24	0	24	24	0	0	0	0
56–60	HIGH	24	0	24	0	24	0	0	0
60–65	HIGH	24	0	24	0	0	24	0	0
65–70.5	HIGH	24	0	24	0	0	0	24	0
70.5–76	HIGH	24	0	24	0	0	0	0	24

MX-2799 ONLY

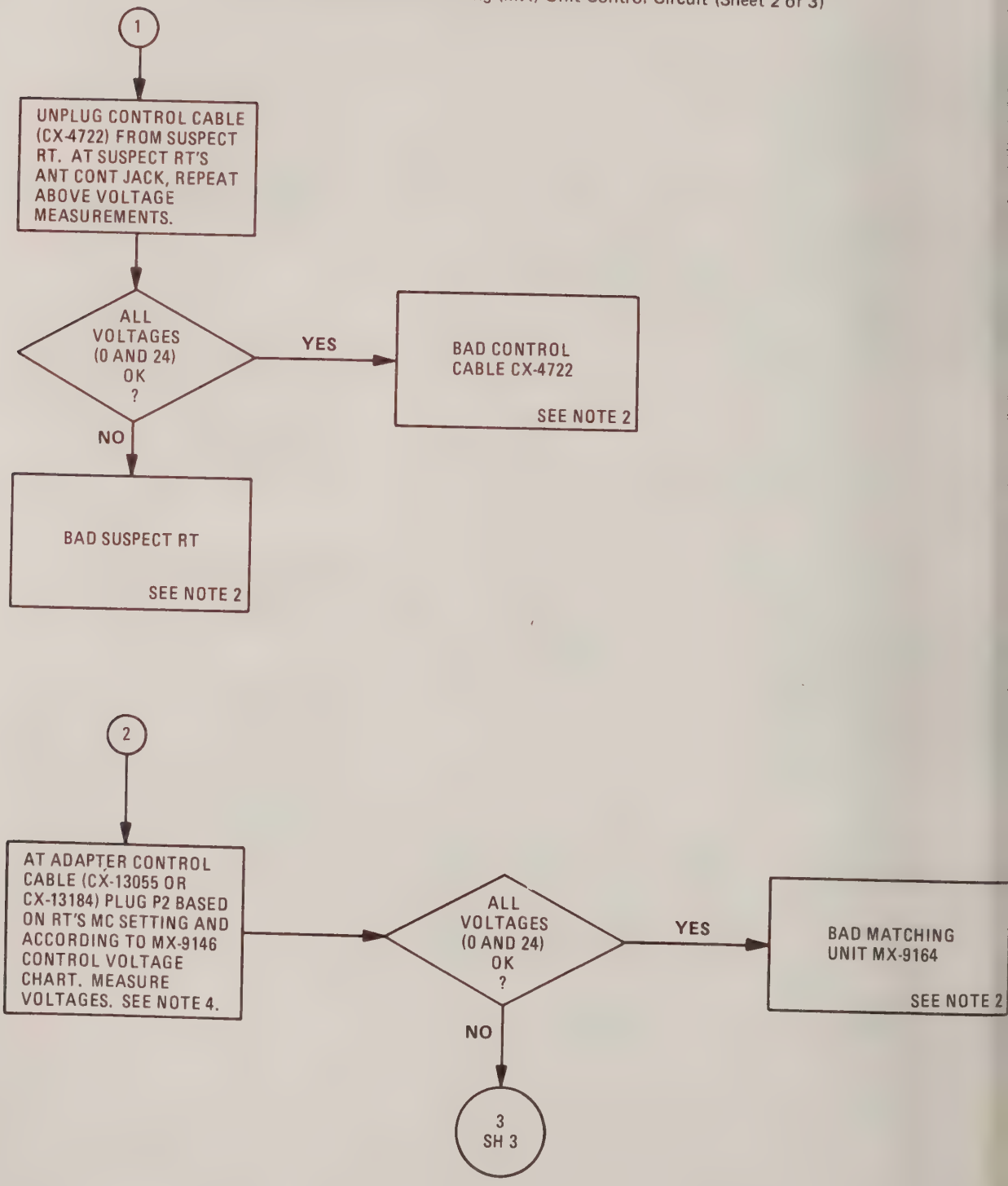
4. Matching unit control voltage chart for MX-9146. Adaptor control cable is CX-13055 or CX-13184 and control cable is CX-4722.

MX-9146

CONTROL VOLTAGES AT P2 OF CX-13055									
SUB-BAND	FREQ MHZ	BAND	PIN DESIGNATION							
			N	A	B	D	E	F	G	H
1	30–33	A	24	24	0	24	0	0	0	0
2	33–37	A	24	24	0	0	24	0	0	0
3	37–42	A	24	24	0	0	0	24	0	0
4	42–47.5	A	24	24	0	0	0	0	24	0
5	47.5–53	A	24	24	0	0	0	0	0	24
6	53–56	B	24	0	24	24	0	0	0	0
7	56–60	B	24	0	24	0	24	0	0	0
8	60–65	B	24	0	24	0	0	24	0	0
9	65–70.5	B	24	0	24	0	0	0	24	0
10	70.5–80	B	24	0	24	0	0	0	0	24

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

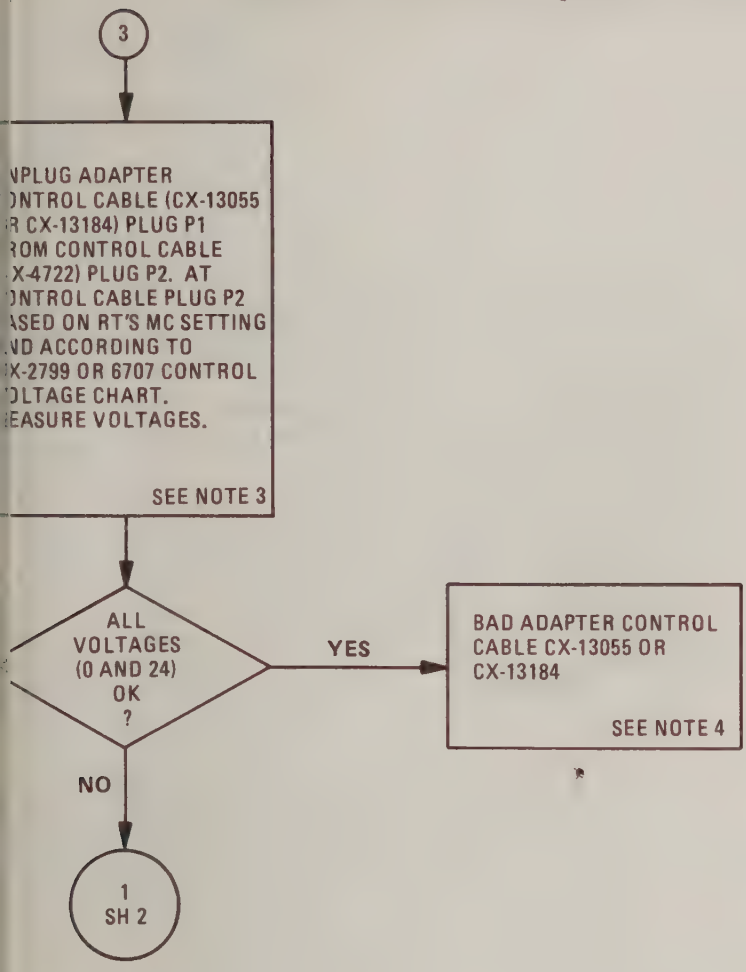
CHART 4
Troubleshoot RT Antenna Matching (MX) Unit Control Circuit (Sheet 2 of 3)


1
UNPLUG CONTROL CABLE (CX-4722) FROM SUSPECT RT. AT SUSPECT RT'S ANT CONT JACK, REPEAT ABOVE VOLTAGE MEASUREMENTS.
ALL VOLTAGES (0 AND 24) OK ?
YES
BAD CONTROL CABLE CX-4722
SEE NOTE 2
NO
BAD SUSPECT RT
SEE NOTE 2
2
AT ADAPTER CONTROL CABLE (CX-13055 OR CX-13184) PLUG P2 BASED ON RT'S MC SETTING AND ACCORDING TO MX-9146 CONTROL VOLTAGE CHART. MEASURE VOLTAGES. SEE NOTE 4.
ALL VOLTAGES (0 AND 24) OK ?
YES
BAD MATCHING UNIT MX-9164
SEE NOTE 2
NO
3
SH 3

2. TROUBLESHOOTING FLOW CHARTS. (CONT)

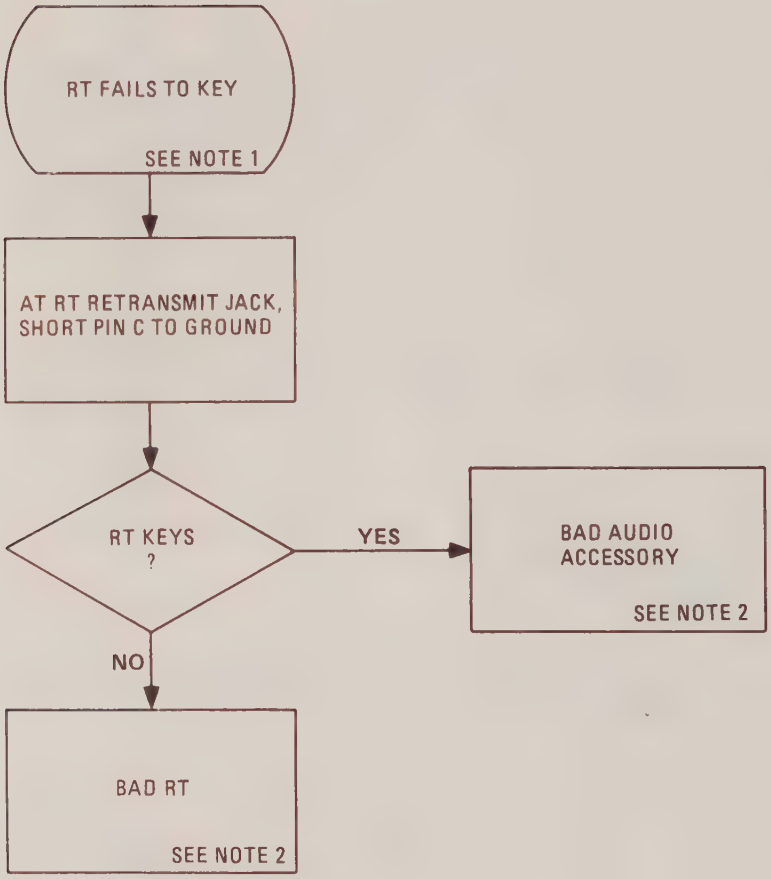
CHART 4

Troubleshoot RT Antenna Matching (MX) Unit Control Circuit (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 5
Troubleshoot RT Keying Circuit (Sheet 1 of 1)



NOTES

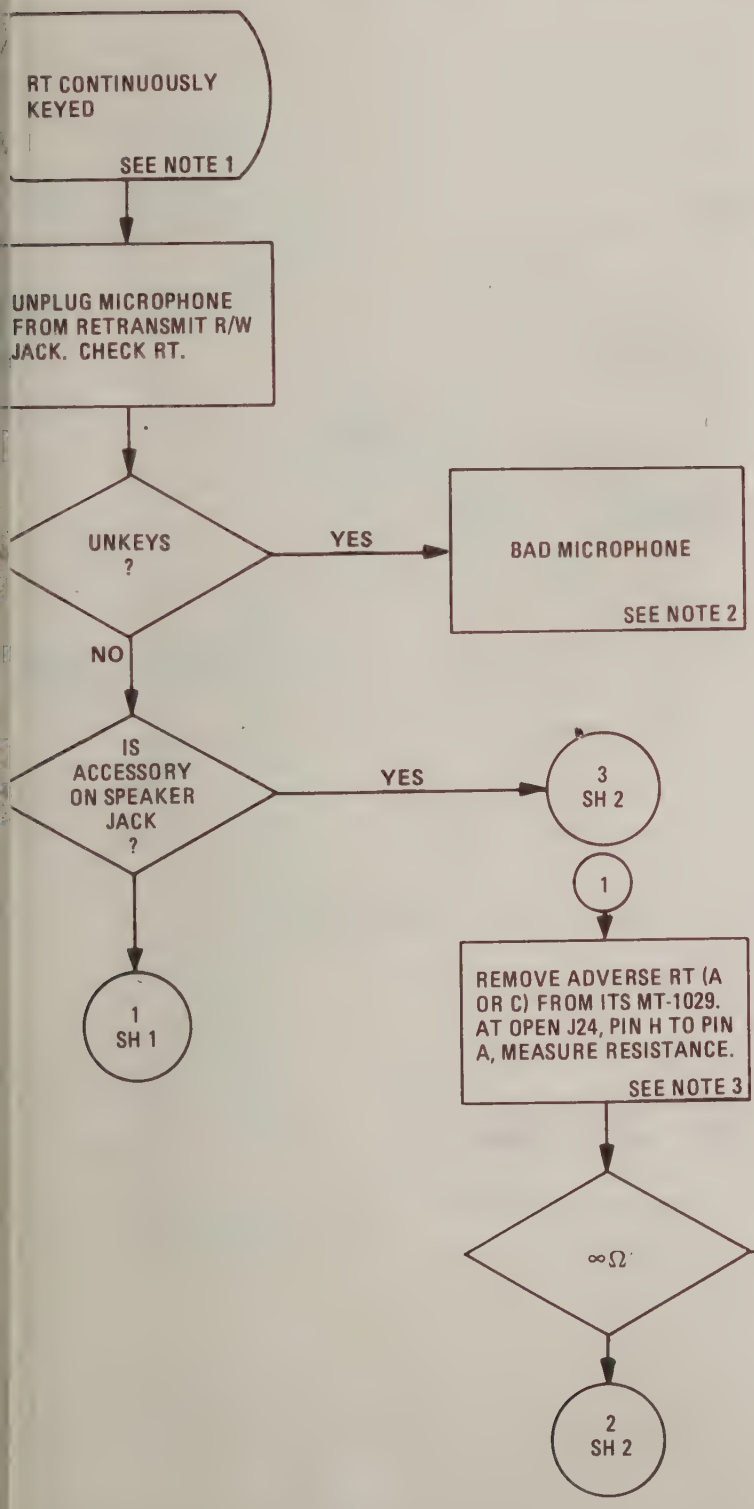
1. This chart is used to troubleshoot either th A-RT or C-RT keying circuit. Refer to FO in back of this manual.

2. Fix or replace and return to operational ch at this time.

2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6

Troubleshoot RT Keying Circuit (Adverse Short) (Sheet 1 of 3)

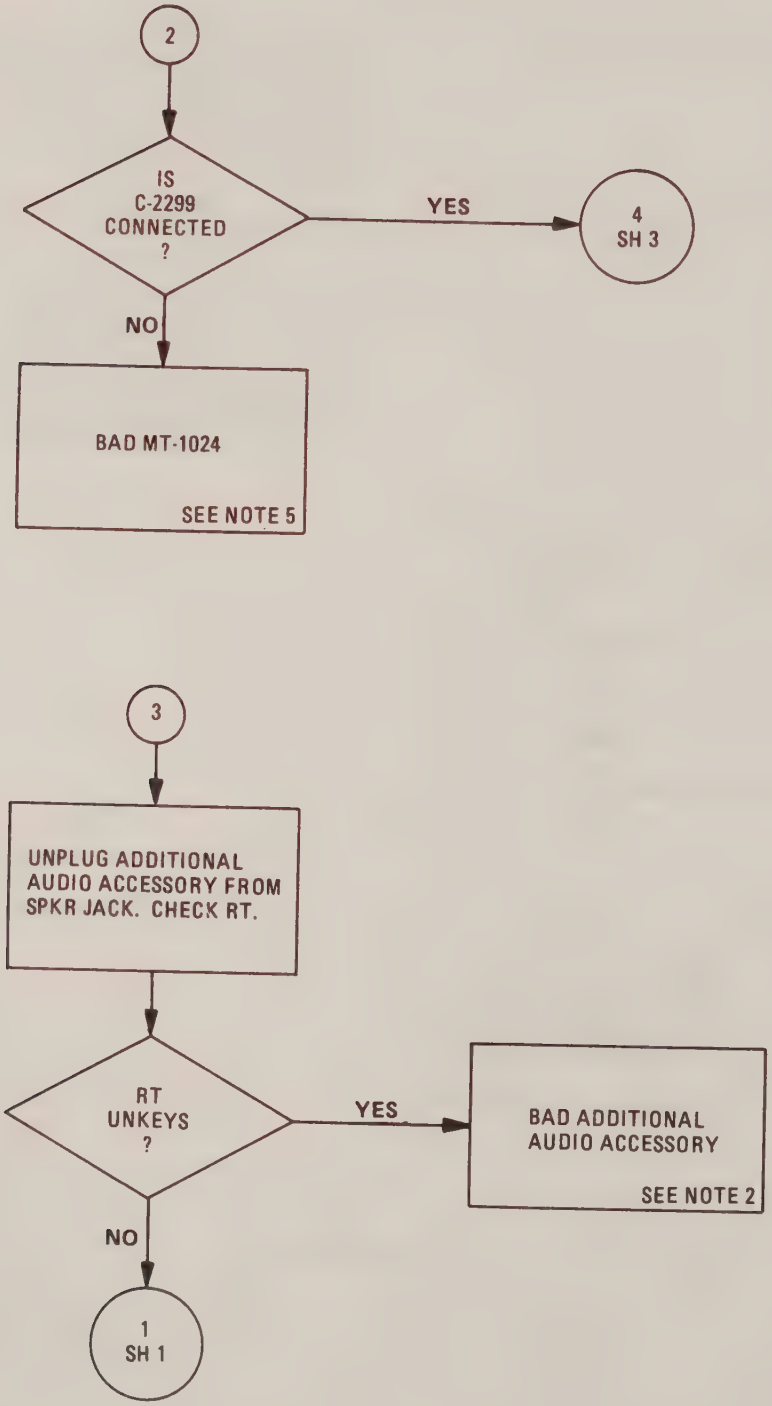


NOTES

1. This chart is used to troubleshoot either the A-RT or C-RT keying circuit. Refer to FO-1 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Leave meter connected to MT-1029, J24 for further tests.
4. For adverse A-RT, unplug CX-4723 from J701; for adverse C-RT, unplug CX-4723 from J702.
5. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

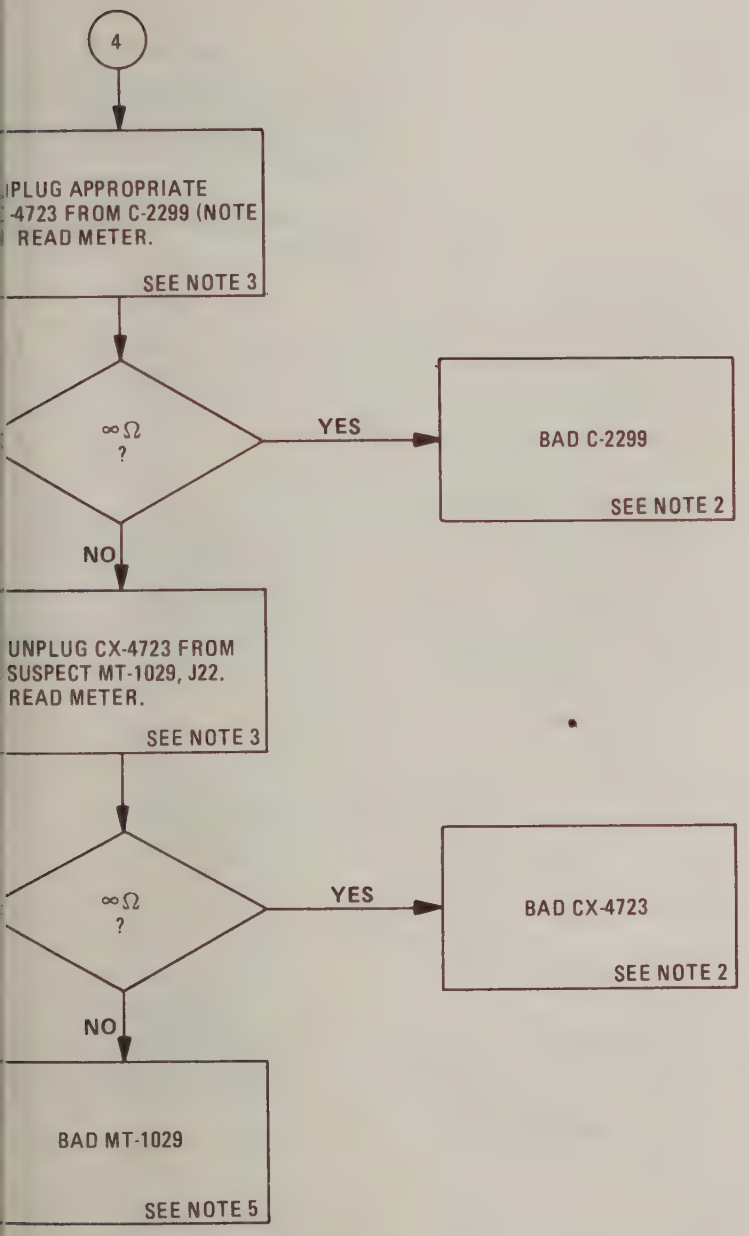
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 6
Troubleshoot RT Keying Circuit (Adverse Short) (Sheet 2 of 3)



2. TROUBLESHOOTING FLOW CHARTS. (CONT)

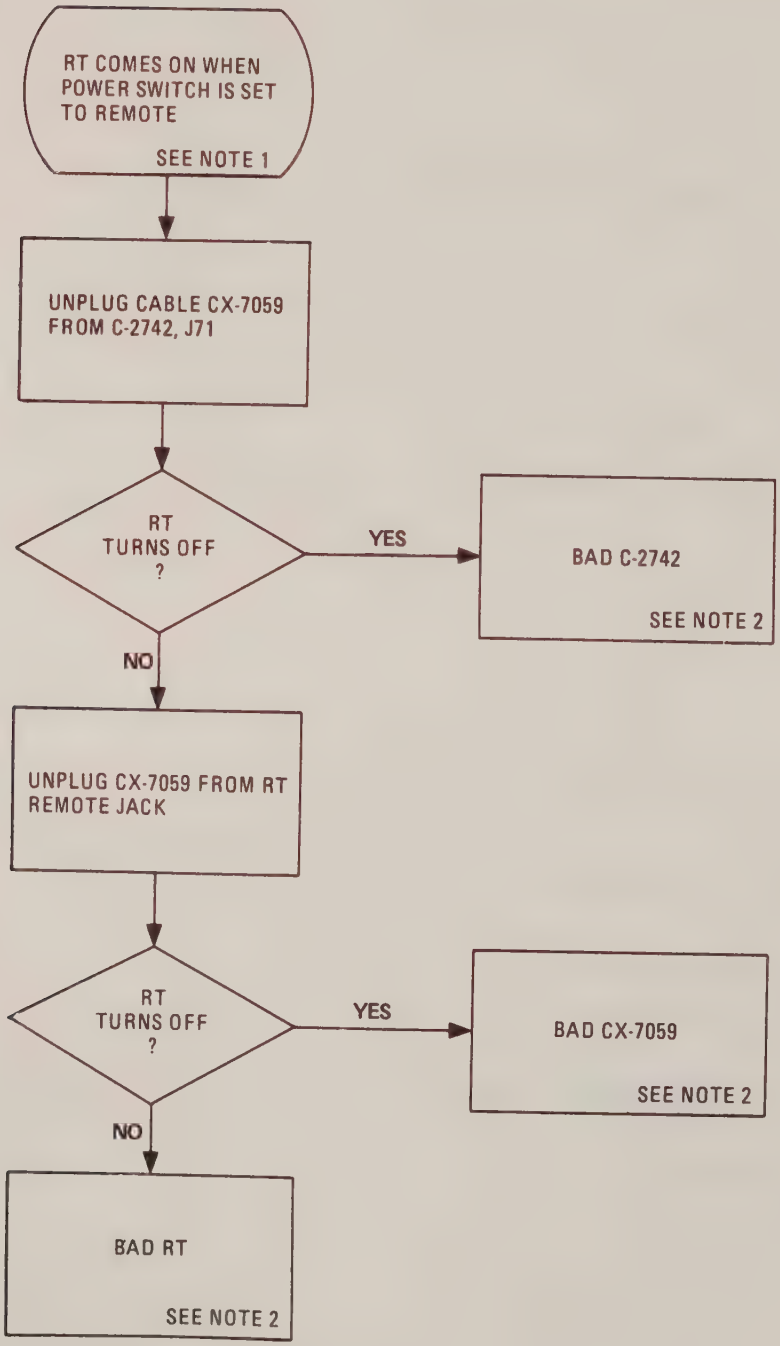
CHART 6
Troubleshoot RT Keying Circuit (Adverse Short) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 7

Troubleshoot RT-246/C-2742 Remote Power Control Circuit (Sheet 1 of 1)



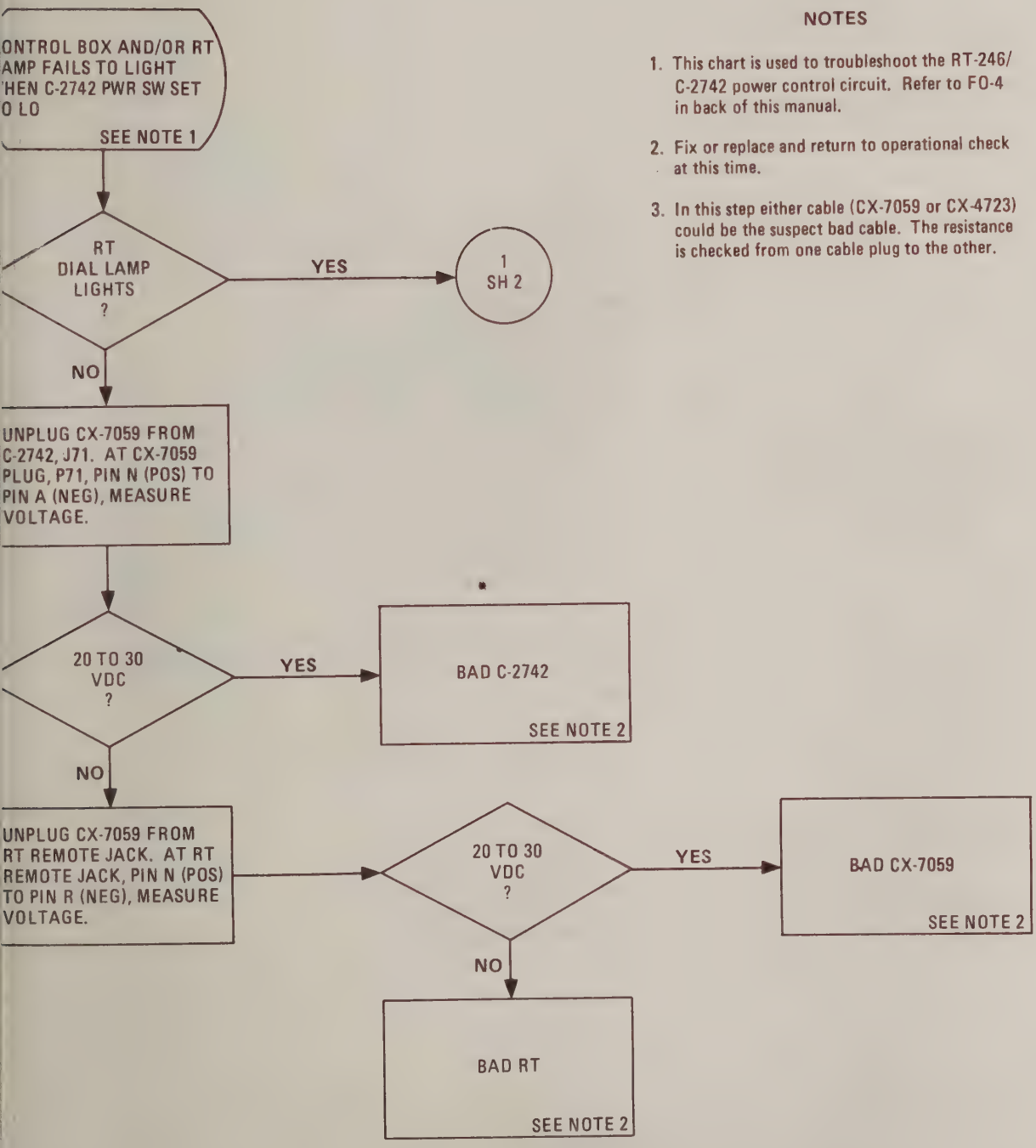
NOTES

1. This chart is used to troubleshoot the RT- remote power control circuit when radio s includes a C-2742. Refer to FO-4 in back this manual.
2. Fix or replace and return to operational ch at this time.

2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 8

Troubleshoot RT-246/C-2742 Power Control (Adverse Open) (Sheet 1 of 3)



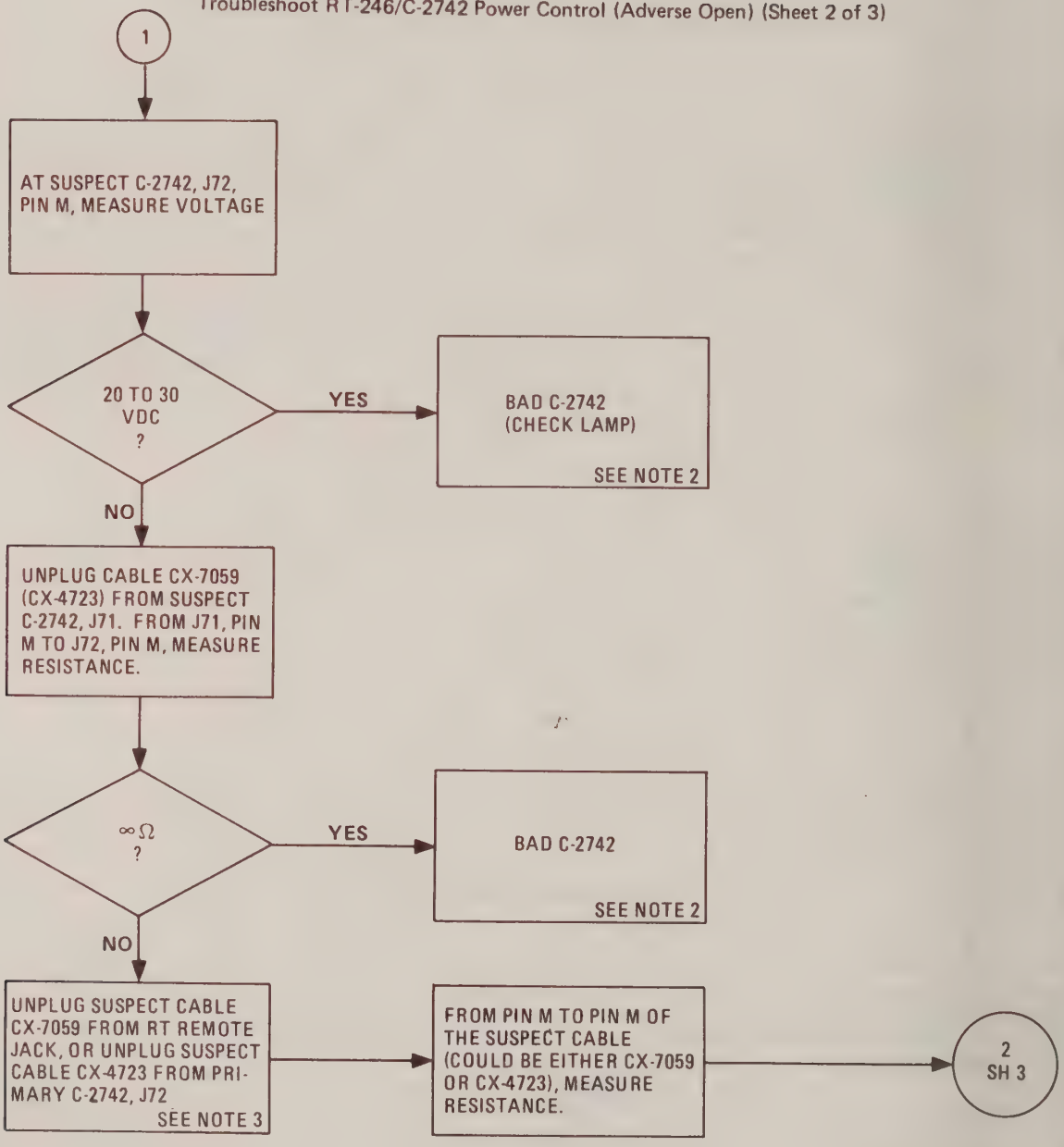
NOTES

1. This chart is used to troubleshoot the RT-246/C-2742 power control circuit. Refer to FO-4 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. In this step either cable (CX-7059 or CX-4723) could be the suspect bad cable. The resistance is checked from one cable plug to the other.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

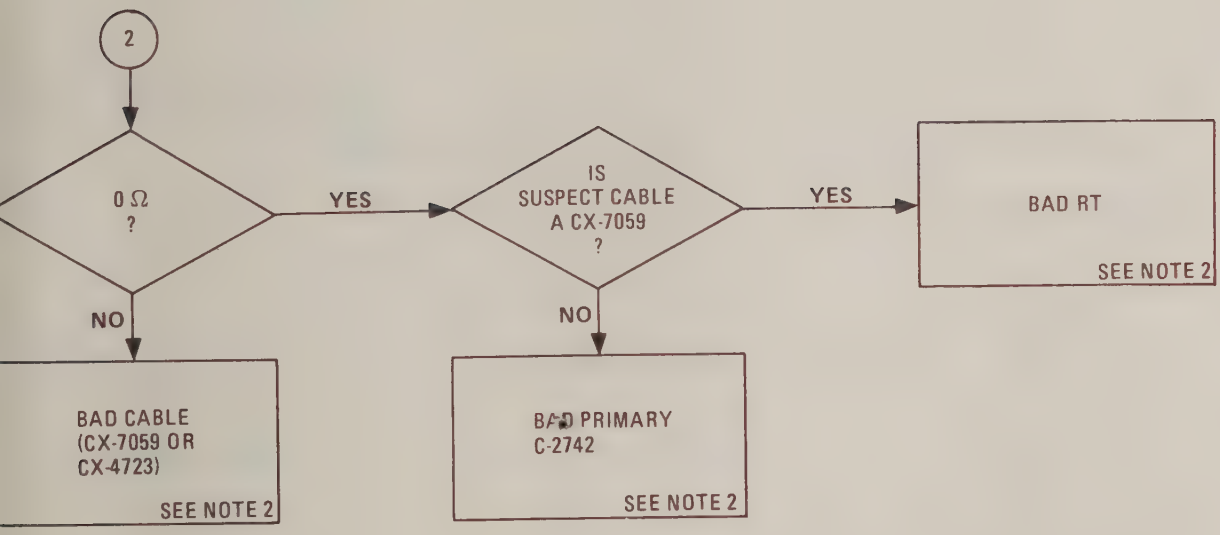
CHART 8

Troubleshoot RT-246/C-2742 Power Control (Adverse Open) (Sheet 2 of 3)


1
AT SUSPECT C-2742, J72, PIN M, MEASURE VOLTAGE
20 TO 30 VDC ?
YES
BAD C-2742 (CHECK LAMP)
SEE NOTE 2
NO
UNPLUG CABLE CX-7059 (CX-4723) FROM SUSPECT C-2742, J71. FROM J71, PIN M TO J72, PIN M, MEASURE RESISTANCE.
∞Ω ?
YES
BAD C-2742
SEE NOTE 2
NO
UNPLUG SUSPECT CABLE CX-7059 FROM RT REMOTE JACK, OR UNPLUG SUSPECT CABLE CX-4723 FROM PRIMARY C-2742, J72
SEE NOTE 3
FROM PIN M TO PIN M OF THE SUSPECT CABLE (COULD BE EITHER CX-7059 OR CX-4723), MEASURE RESISTANCE.
2
SH 3

2. TROUBLESHOOTING FLOW CHARTS. (CONT)

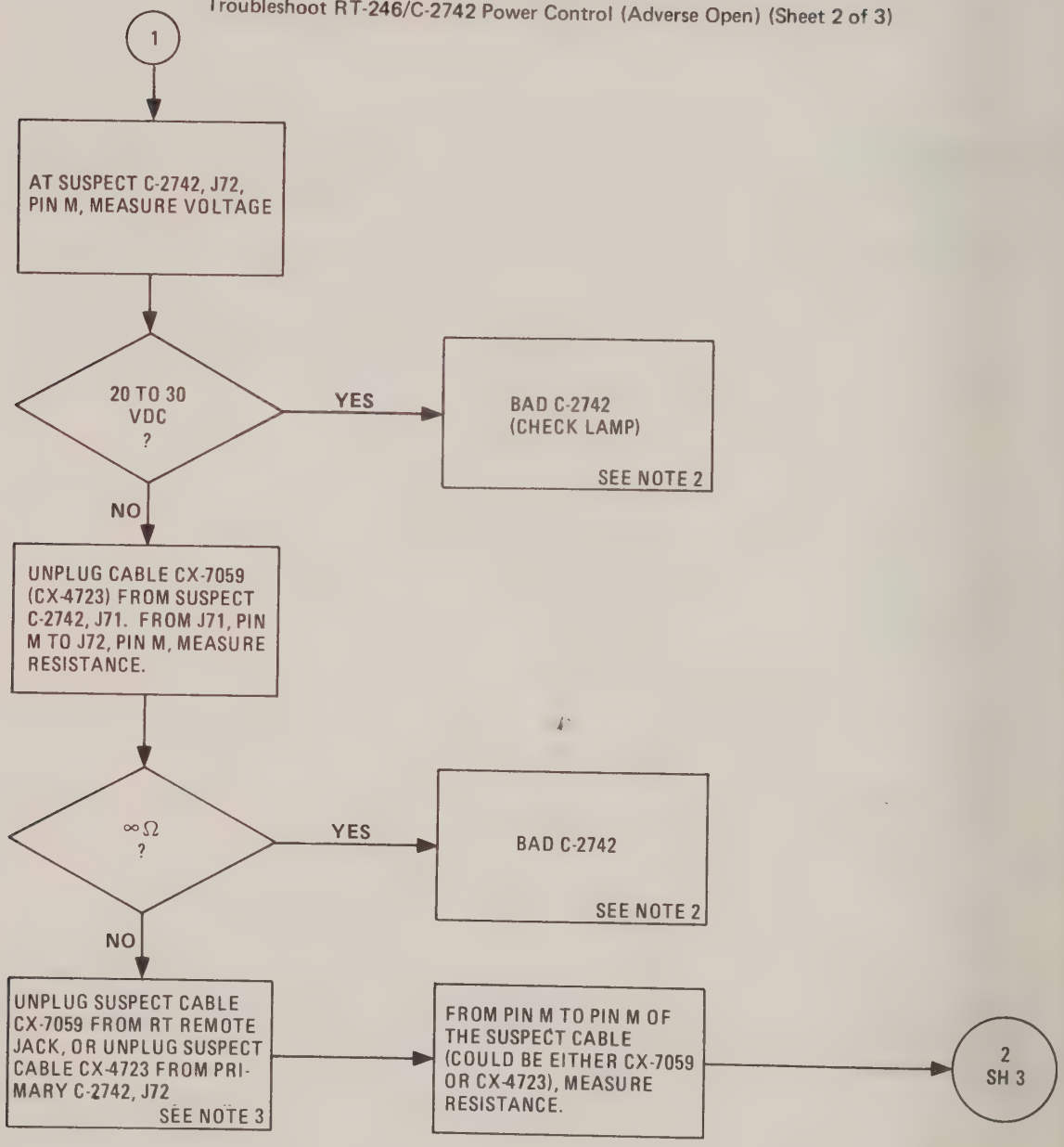
CHART 8
Troubleshoot RT-246/C-2742 Power Control (Adverse Open) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

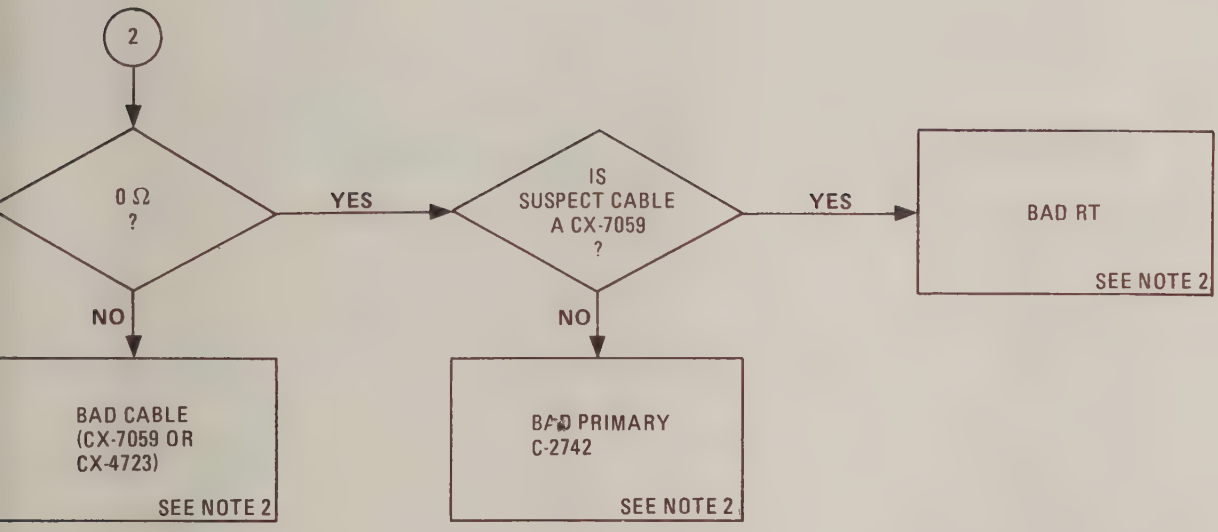
CHART 8

Troubleshoot RT-246/C-2742 Power Control (Adverse Open) (Sheet 2 of 3)


1
AT SUSPECT C-2742, J72, PIN M, MEASURE VOLTAGE
20 TO 30 VDC ?
YES
BAD C-2742 (CHECK LAMP)
SEE NOTE 2
NO
UNPLUG CABLE CX-7059 (CX-4723) FROM SUSPECT C-2742, J71. FROM J71, PIN M TO J72, PIN M, MEASURE RESISTANCE.
∞Ω ?
YES
BAD C-2742
SEE NOTE 2
NO
UNPLUG SUSPECT CABLE CX-7059 FROM RT REMOTE JACK, OR UNPLUG SUSPECT CABLE CX-4723 FROM PRIMARY C-2742, J72
SEE NOTE 3
FROM PIN M TO PIN M OF THE SUSPECT CABLE (COULD BE EITHER CX-7059 OR CX-4723), MEASURE RESISTANCE.
2
SH 3

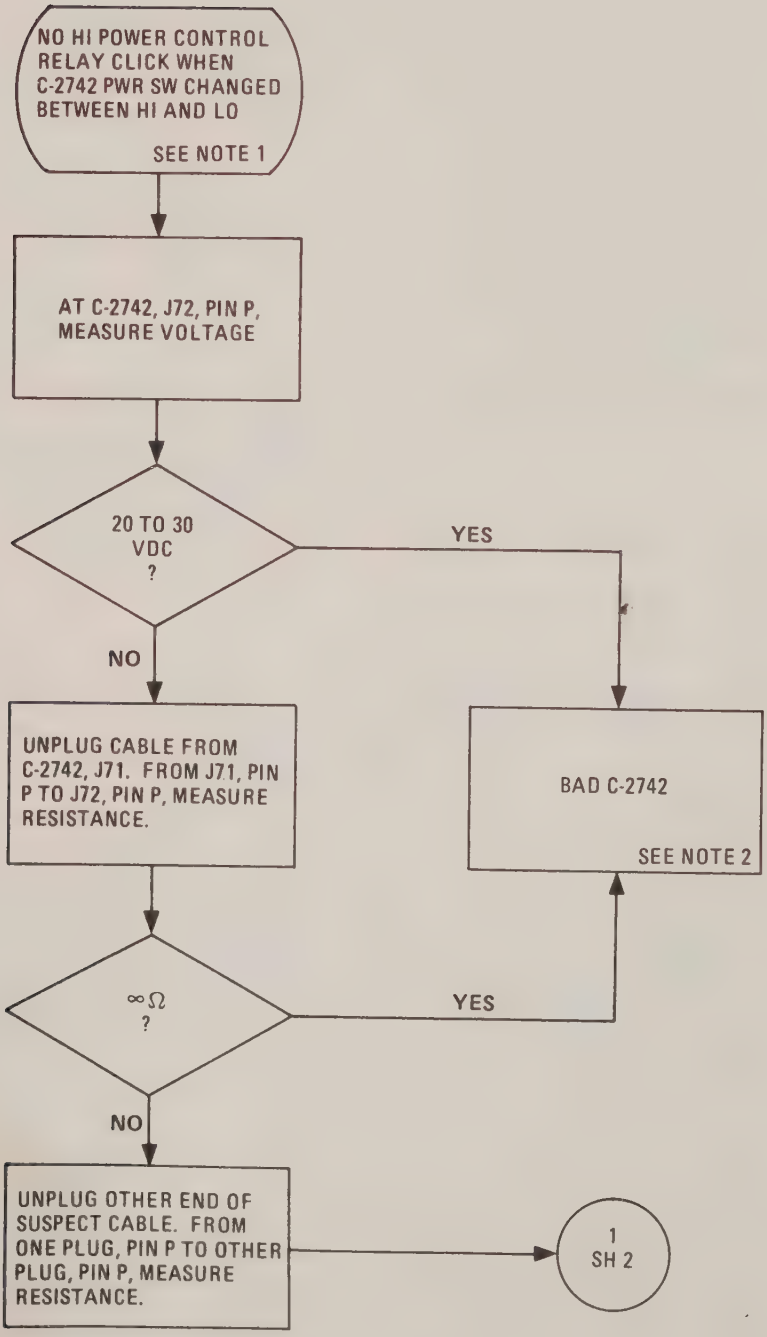
12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 8
Troubleshoot RT-246/C-2742 Power Control (Adverse Open) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 9
Troubleshoot C-2742 Hi/Lo Power Control (Sheet 1 of 2)

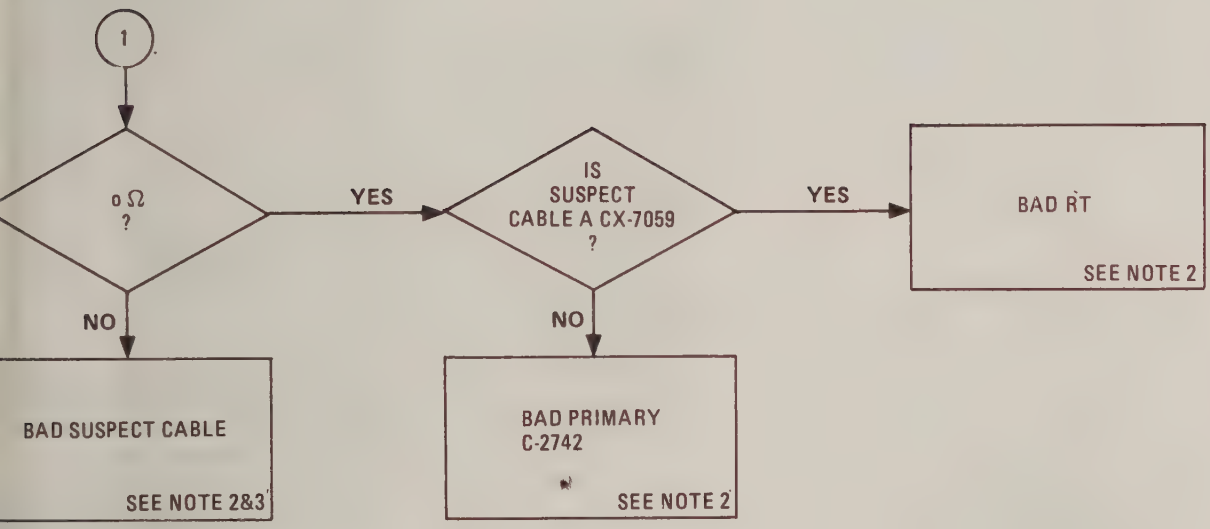

NO HI POWER CONTROL RELAY CLICK WHEN C-2742 PWR SW CHANGED BETWEEN HI AND LO
SEE NOTE 1
AT C-2742, J72, PIN P, MEASURE VOLTAGE
20 TO 30 VDC ?
YES
NO
UNPLUG CABLE FROM C-2742, J71. FROM J71, PIN P TO J72, PIN P, MEASURE RESISTANCE.
BAD C-2742
SEE NOTE 2
∞Ω ?
YES
NO
UNPLUG OTHER END OF SUSPECT CABLE. FROM ONE PLUG, PIN P TO OTHER PLUG, PIN P, MEASURE RESISTANCE.
1 SH 2

NOTES

1. Use this chart to troubleshoot the C-2742 HI/LO power control circuit. Refer to FO- in back of this manual.
2. Fix or replace and return to operational che at this time.
3. In this step either cable (CX-7059 or CX-47 could be the suspect bad cable. The resistar is checked from one cable plug to the other.

12. **TROUBLESHOOTING FLOW CHARTS.** (CONT)

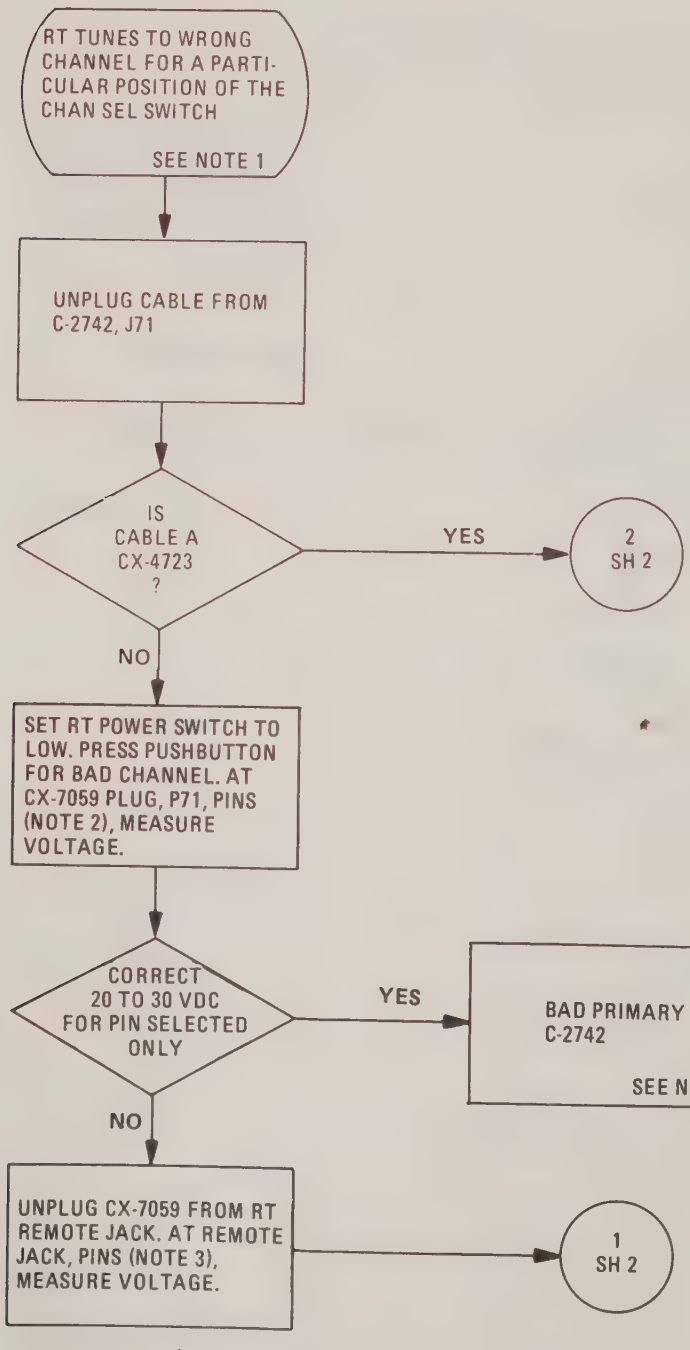
CHART 9
Troubleshoot C-2742 Hi/Lo Power Control (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 10

Troubleshoot Remote (C-2742) Frequency Selection (Wrong Selection) (Sheet 1 of 3)


RT TUNES TO WRONG CHANNEL FOR A PARTICULAR POSITION OF THE CHAN SEL SWITCH
SEE NOTE 1
UNPLUG CABLE FROM C-2742, J71
IS CABLE A CX-4723 ?
YES
2 SH 2
NO
SET RT POWER SWITCH TO LOW. PRESS PUSHBUTTON FOR BAD CHANNEL. AT CX-7059 PLUG, P71, PINS (NOTE 2), MEASURE VOLTAGE.
CORRECT 20 TO 30 VDC FOR PIN SELECTED ONLY
YES
BAD PRIMARY C-2742
SEE NOTE 4
NO
UNPLUG CX-7059 FROM RT REMOTE JACK. AT REMOTE JACK, PINS (NOTE 3), MEASURE VOLTAGE.
1 SH 2

NOTES

1. This chart is used to troubleshoot the remote frequency selection circuit. Refer to FO-4 in back of this manual.

2. For the CHAN SEL position selected, the P71, J72 pin indicated should have a 20 to 30 VDC reading. All other channel pins shou show zero (0) volts. See table below.

CHANNEL	P71, J72 PIN
1	T
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

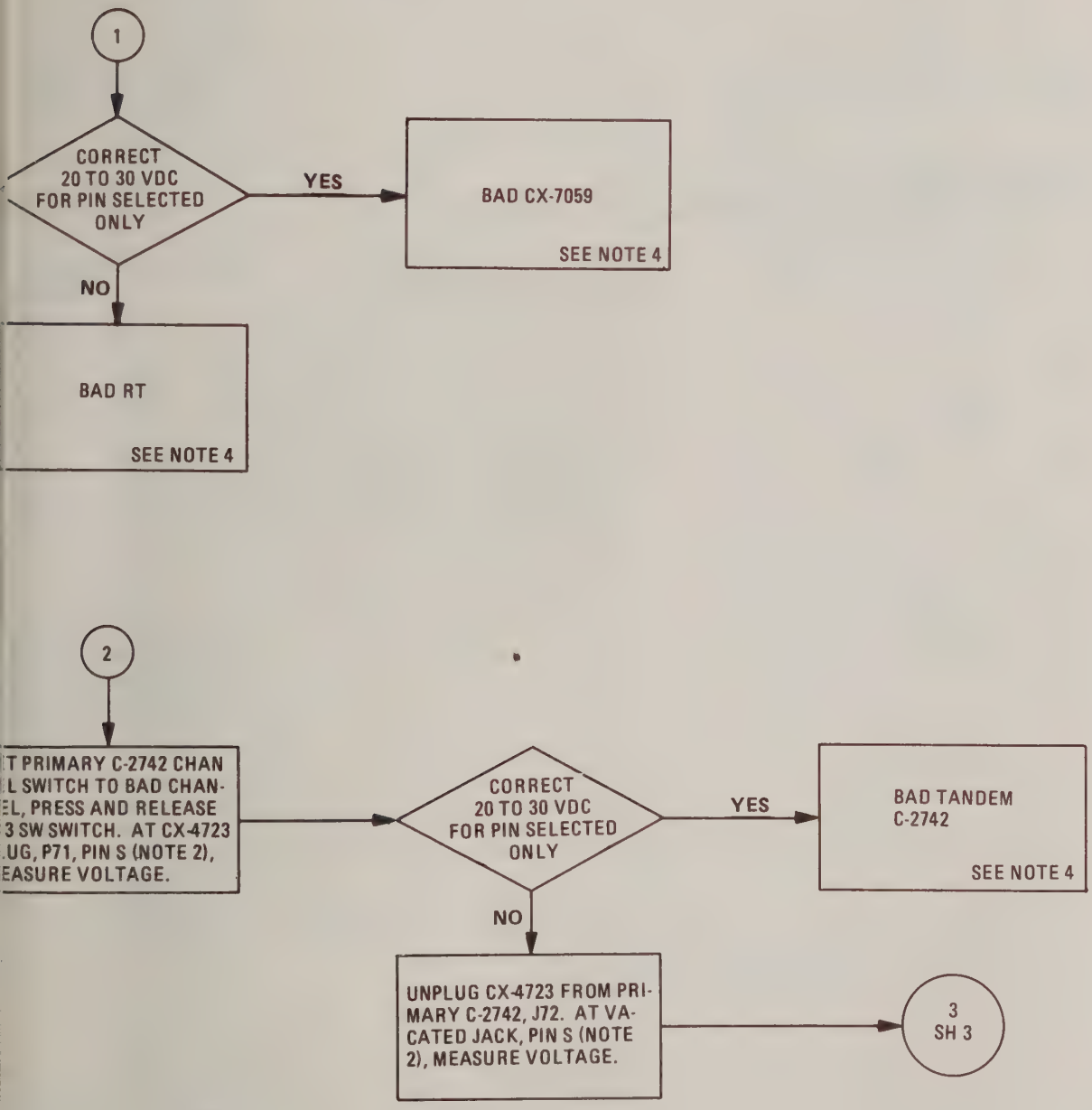
3. For the channel button pressed, the REMOTE jack pin indicated should be 20 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

CHANNEL	REMOTE jack, pin
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

4. Fix or replace and return to operational check at this time.

2. TROUBLESHOOTING FLOW CHARTS. (CONT)

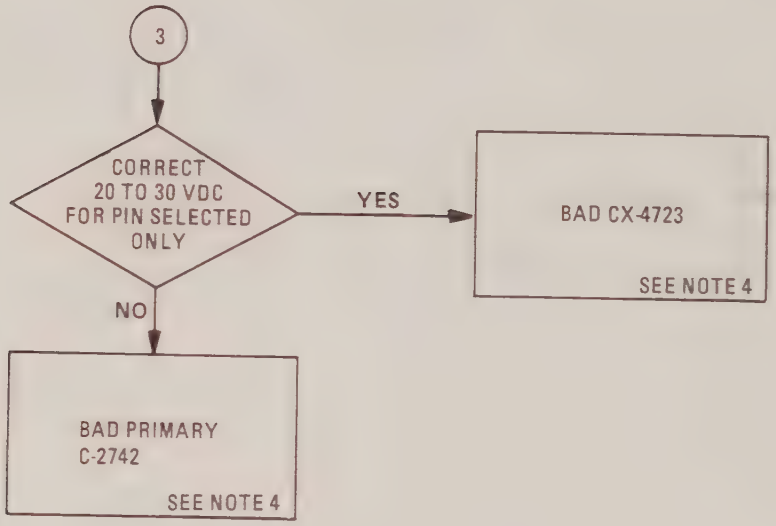
CHART 10
Troubleshoot Remote (C-2742) Frequency Selection (Wrong Selection) (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 10

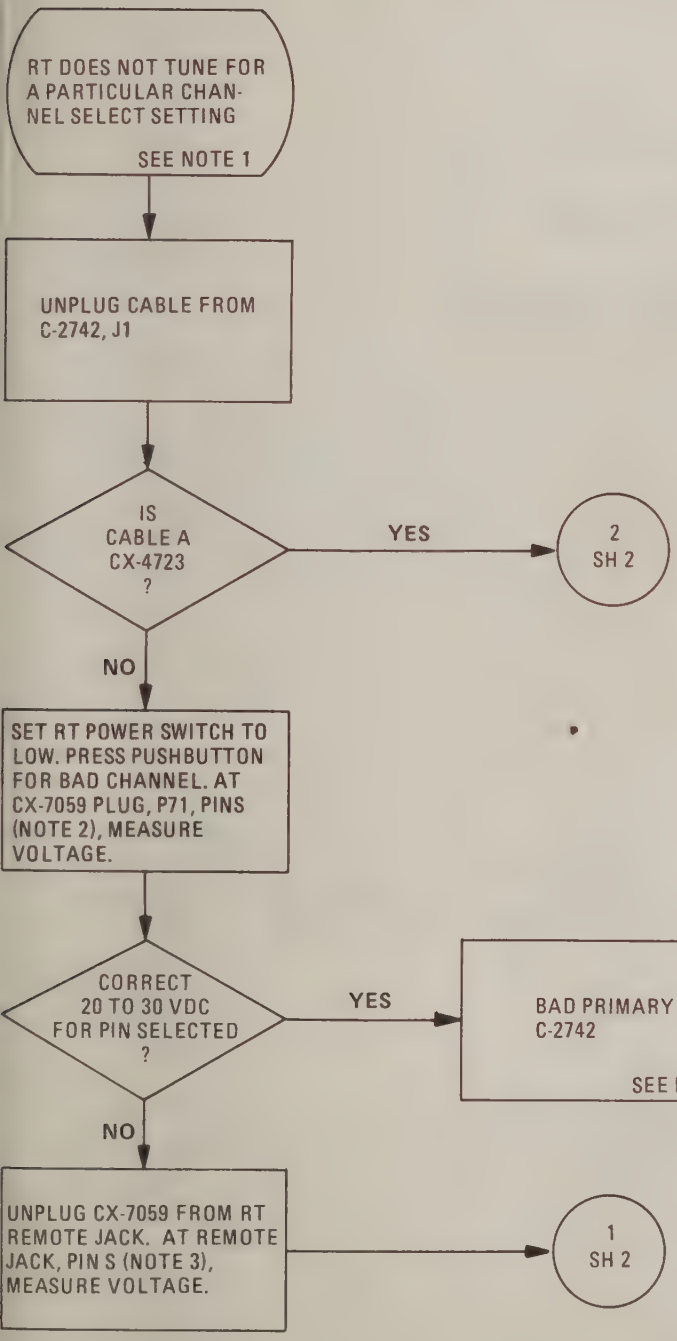
Troubleshoot Remote (C-2742) Frequency Selection (Wrong Selection) (Sheet 3 of 3)



-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 11

Troubleshoot Remote (C-2742) Frequency Selection (No Selection) (Sheet 1 of 3)


RT DOES NOT TUNE FOR A PARTICULAR CHANNEL SELECT SETTING
SEE NOTE 1
UNPLUG CABLE FROM C-2742, J1
IS CABLE A CX-4723 ?
YES
2 SH 2
NO
SET RT POWER SWITCH TO LOW. PRESS PUSHBUTTON FOR BAD CHANNEL. AT CX-7059 PLUG, P71, PINS (NOTE 2), MEASURE VOLTAGE.
CORRECT 20 TO 30 VDC FOR PIN SELECTED ?
YES
BAD PRIMARY C-2742
SEE NOTE 4
NO
UNPLUG CX-7059 FROM RT REMOTE JACK. AT REMOTE JACK, PIN S (NOTE 3), MEASURE VOLTAGE.
1 SH 2

NOTES

1. This chart is used to troubleshoot the remote frequency selection circuit. Refer to FO-4 in back of this manual.
2. For the CHAN SEL position selected, the P71, J72 pin indicated should have a 20 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

CHANNEL	P71, J72 PIN
1	T
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

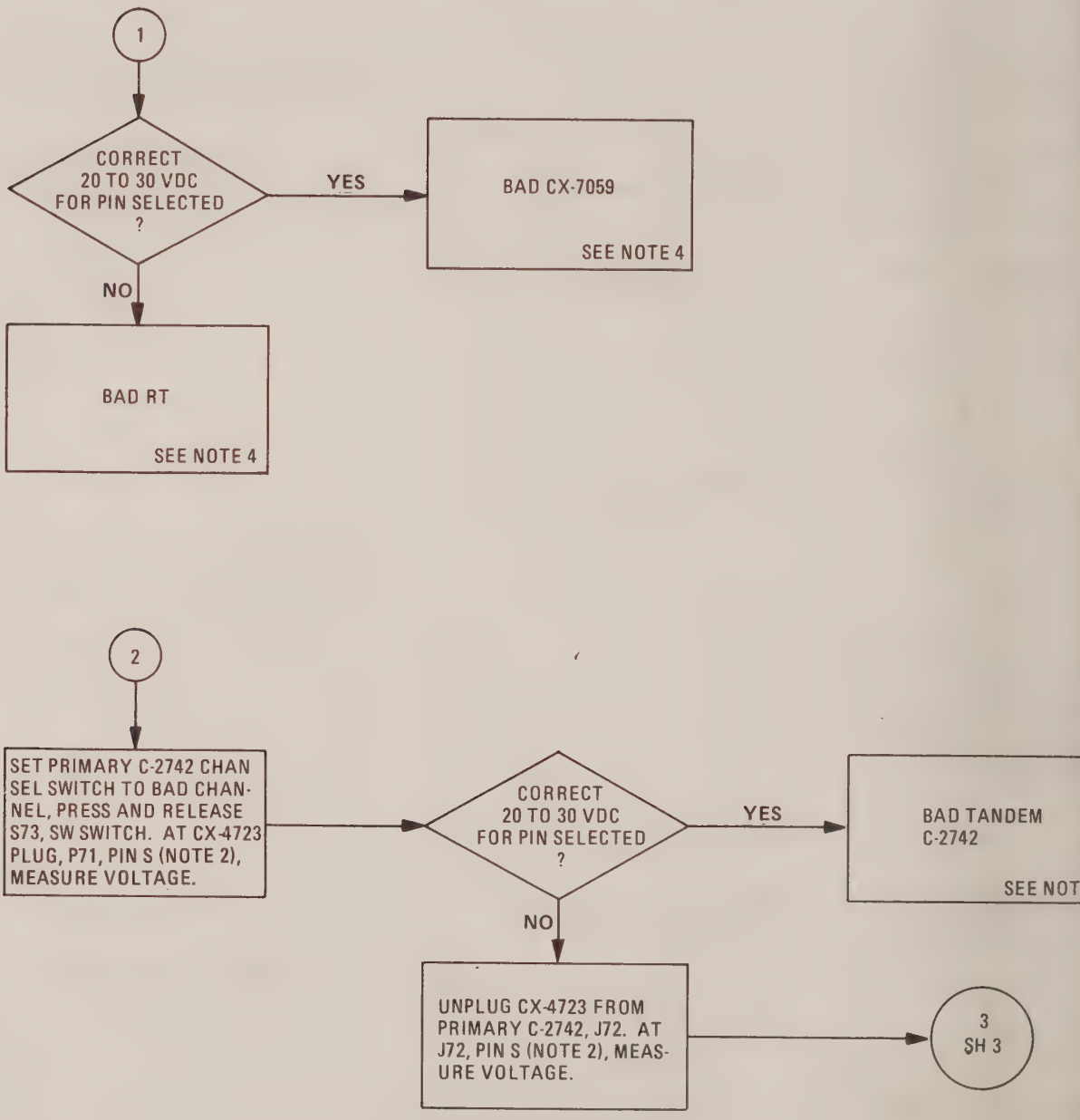
3. For the channel button pressed, the REMOTE jack pin indicated should be 20 to 30 VDC reading. All other channel pins should show zero (0) volts. See table below.

CHANNEL	REMOTE jack, pin
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L

4. Fix or replace and return to operational check at this time.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

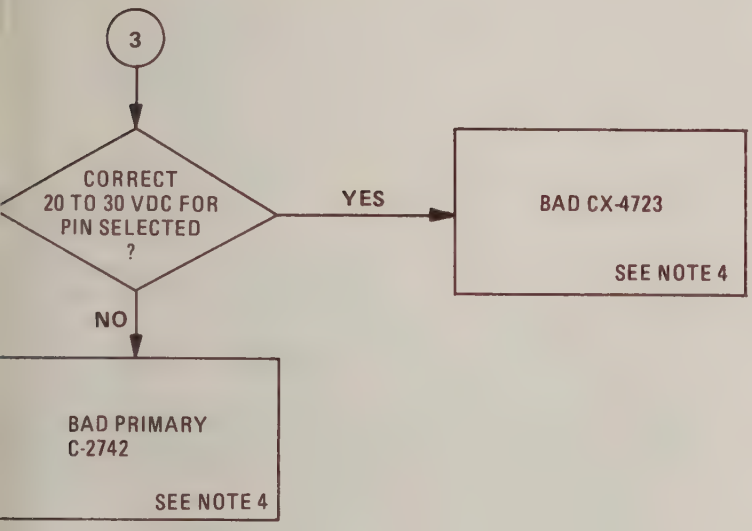
CHART 11
Troubleshoot Remote (C-2742) Frequency Selection (No Selection) (Sheet 2 of 3)


1
CORRECT 20 TO 30 VDC FOR PIN SELECTED ?
YES
BAD CX-7059
SEE NOTE 4
NO
BAD RT
SEE NOTE 4
2
SET PRIMARY C-2742 CHAN SEL SWITCH TO BAD CHANNEL, PRESS AND RELEASE S73, SW SWITCH. AT CX-4723 PLUG, P71, PIN S (NOTE 2), MEASURE VOLTAGE.
CORRECT 20 TO 30 VDC FOR PIN SELECTED ?
YES
BAD TANDEM C-2742
SEE NOTE 4
NO
UNPLUG CX-4723 FROM PRIMARY C-2742, J72. AT J72, PIN S (NOTE 2), MEASURE VOLTAGE.
3
SH 3

12. **TROUBLESHOOTING FLOW CHARTS.** (CONT)

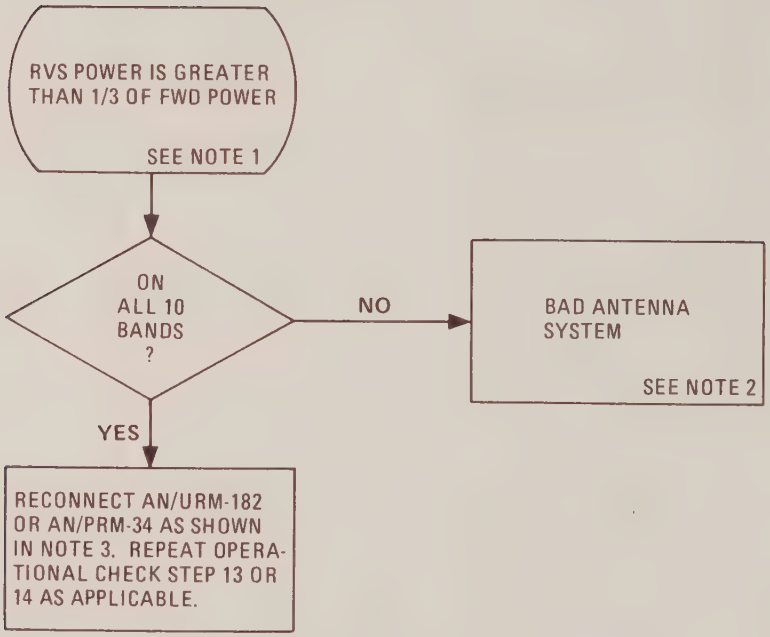
CHART 11

Troubleshoot Remote (C-2742) Frequency Selection (No Selection) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 12
Troubleshoot Fwd to RVS Power Ratio (Sheet 1 of 1)


RVS POWER IS GREATER THAN 1/3 OF FWD POWER
SEE NOTE 1
ON ALL 10 BANDS ?
NO
BAD ANTENNA SYSTEM
SEE NOTE 2
YES
RECONNECT AN/URM-182 OR AN/PRM-34 AS SHOWN IN NOTE 3. REPEAT OPERATIONAL CHECK STEP 13 OR 14 AS APPLICABLE.

NOTES

1. This chart is used to troubleshoot the forw to reverse power ratio of the antenna circu

2. Fix or replace and return to operational ch at this time.

3. Disconnect cables CG-409 and CG-1773/U from test setup. Move Test Set from RT t base of antenna. Reconnect cables as shov below.

   a. Test Set AN/PRM-34

      CG-409: Connect between Test Set AN Jack and Matching Unit J2

      CG-1773/U: Connect between Test Se RADIO Jack of RT ANT Jack

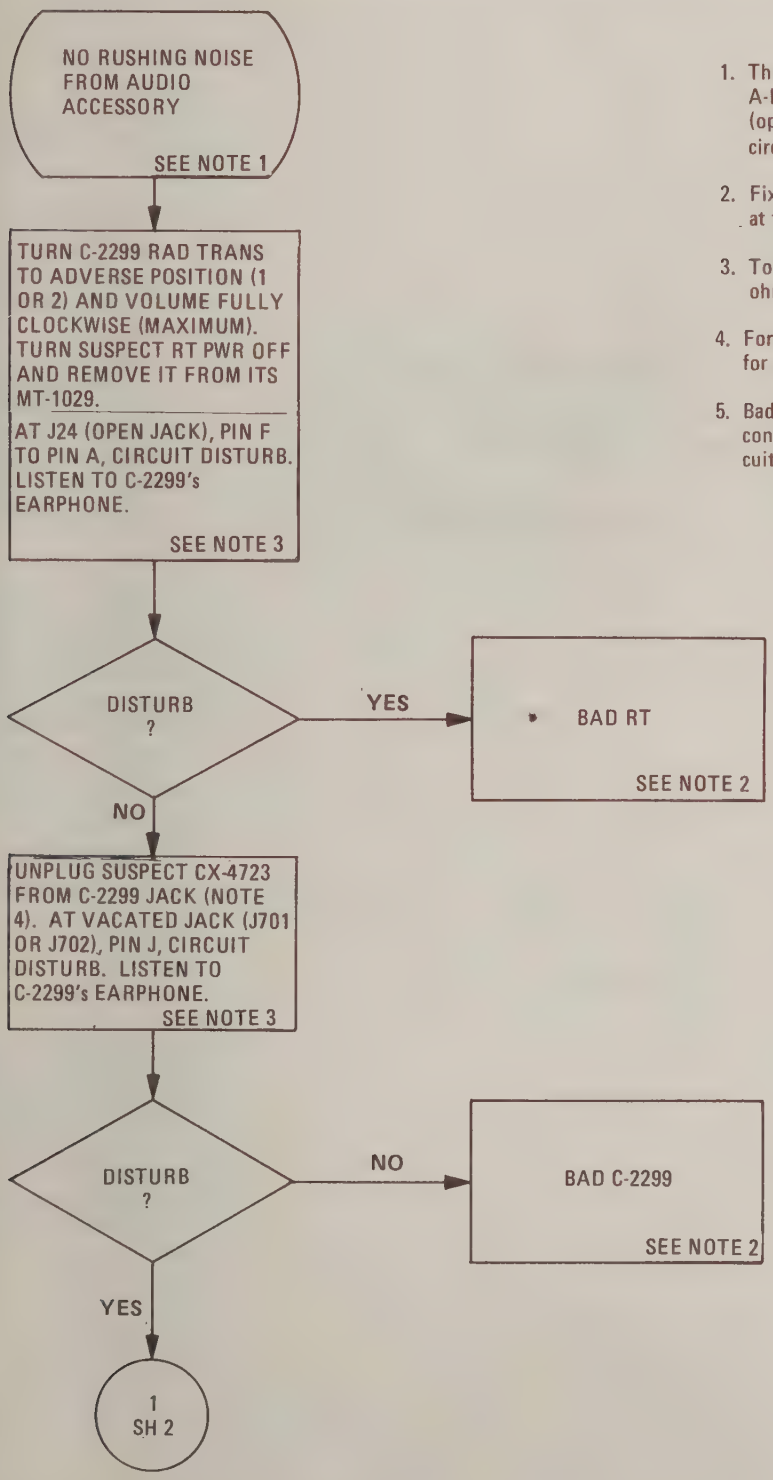
   b. Test Set AN/URM-182

      CG-409: Connect between J4 on TS-2 and Matching Unit J1

      CG-1773/U: Connect between J3 on TS-2609 and RT ANT Jack.

TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 13
Troubleshoot C-2299 Monitor Circuit (Sheet 1 of 2)

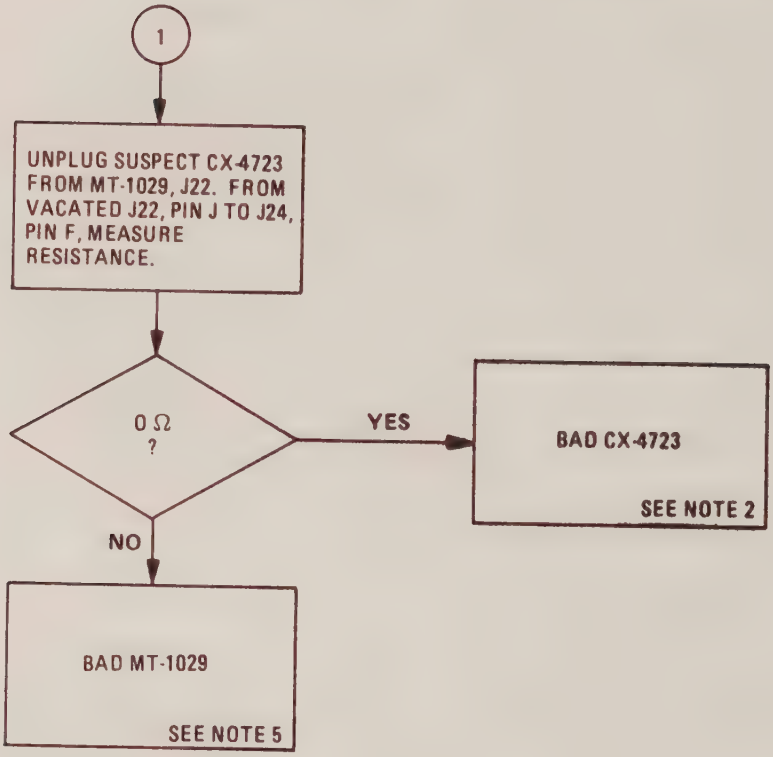

NO RUSHING NOISE FROM AUDIO ACCESSORY
SEE NOTE 1
TURN C-2299 RAD TRANS TO ADVERSE POSITION (1 OR 2) AND VOLUME FULLY CLOCKWISE (MAXIMUM). TURN SUSPECT RT PWR OFF AND REMOVE IT FROM ITS MT-1029.
AT J24 (OPEN JACK), PIN F TO PIN A, CIRCUIT DISTURB. LISTEN TO C-2299's EARPHONE.
SEE NOTE 3
DISTURB ?
YES
BAD RT
SEE NOTE 2
NO
UNPLUG SUSPECT CX-4723 FROM C-2299 JACK (NOTE 4). AT VACATED JACK (J701 OR J702), PIN J, CIRCUIT DISTURB. LISTEN TO C-2299's EARPHONE.
SEE NOTE 3
DISTURB ?
NO
BAD C-2299
SEE NOTE 2
YES
1
SH 2

NOTES

1. This chart is used to troubleshoot either the A-RT (operational check step 18) or C-RT (operational check step 21) C-2299 monitoring circuit. Refer to FO-3 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. To circuit disturb, set up multimeter as an ohmmeter, RX10.
4. For adverse A-RT, unplug CX-4723 from J701; for adverse C-RT, unplug CX-4723 from J702.
5. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

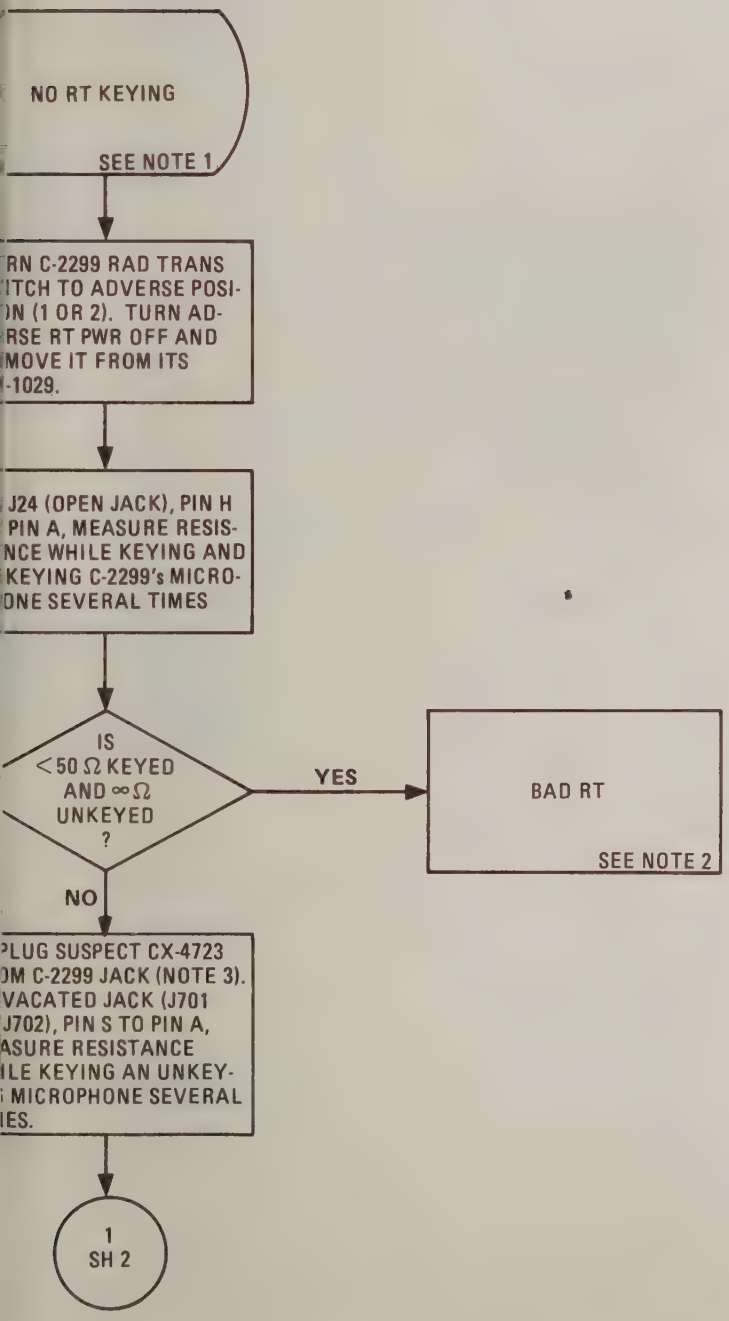
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 13
Troubleshoot C-2299 Monitor Circuit (Sheet 2 of 2)



TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 14
Troubleshoot C-2299 Keying Circuit (Sheet 1 of 2)

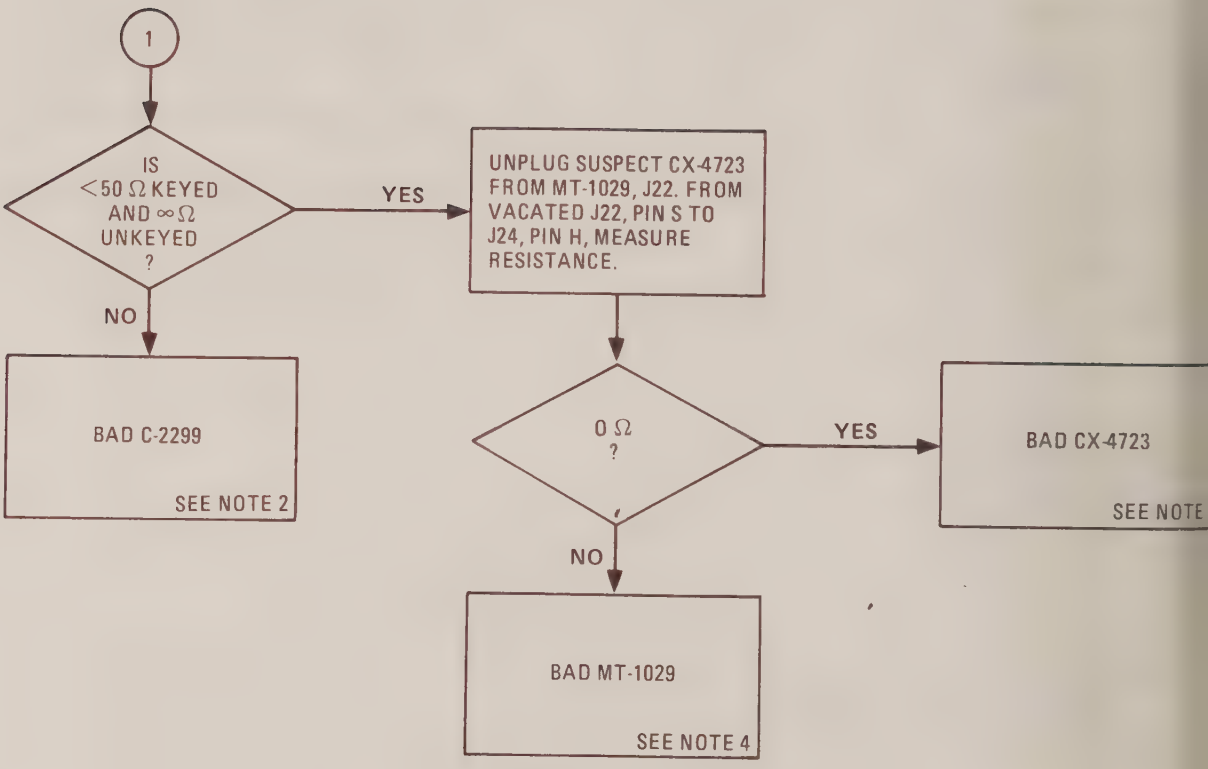


NOTES

1. This chart is used to troubleshoot either the A-RT (operational check step 19) or C-RT (operational check step 22) C-2299 keying circuit. Refer to FO-3 in back of this manual.
2. Fix or repair and return to operational check at this time.
3. For adverse A-RT, unplug CX-4723 from J701; for adverse C-RT, unplug CX-4723 from J702.
4. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

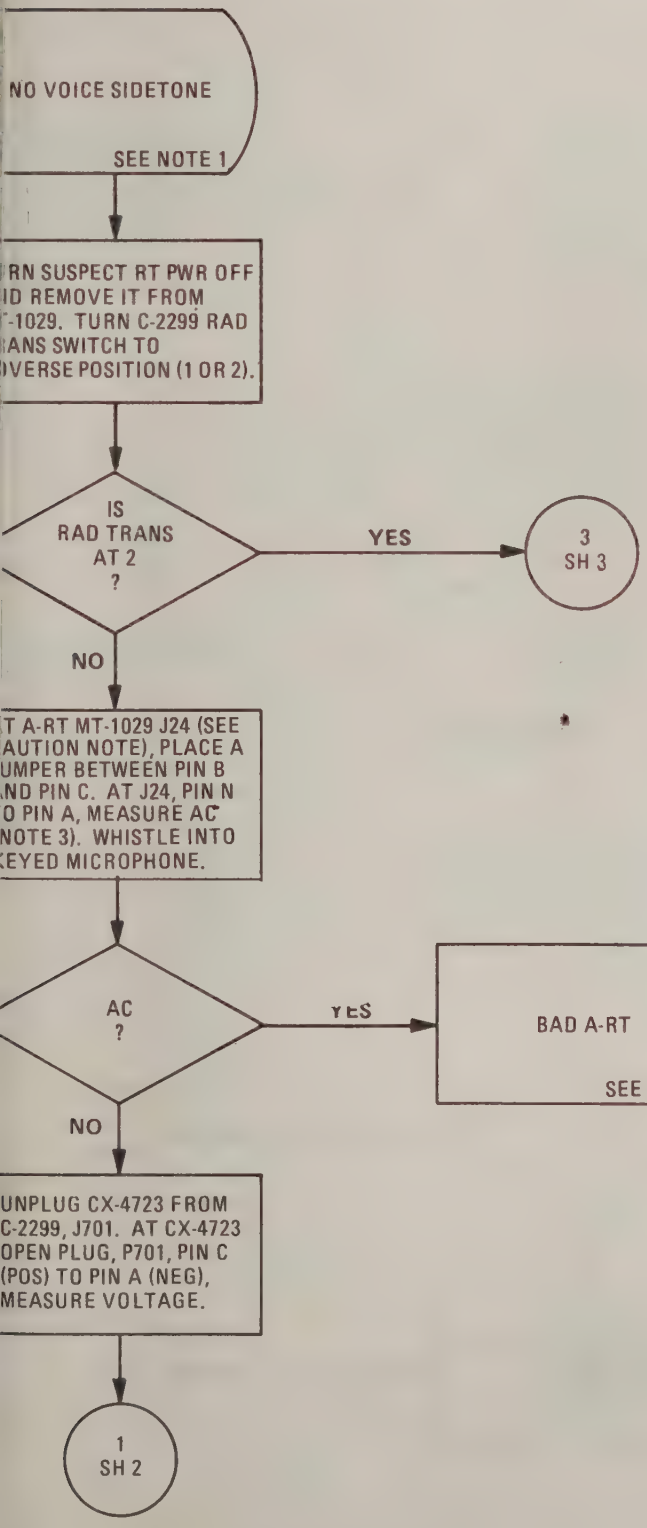
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 14
Troubleshoot C-2299 Keying Circuit (Sheet 2 of 2)



2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 15
Troubleshoot C-2299 RT Modulation Circuit (Sheet 1 of 4)

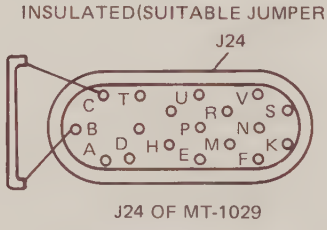


NOTES

1. This chart is used to troubleshoot either the A-RT (operational check step 20) or C-RT (operational check step 23) modulation circuit. Refer to FO-3 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. To measure AC talk signal, set up the multimeter as an AC voltmeter (lowest range), and then connect the meter probe across the signal lines (J24, pin N to pin A). Key the mike and note reading. Next, sharply whistle into keyed mike and watch to see if the meter reading changes. A change of the reading (up or down) indicates the presence of the talk signal.
4. Leave the meter connected for further tests.

CAUTION

To guard against equipment damage while placing jumper J24, make sure that only the correct pins are connected. (See figure below.)

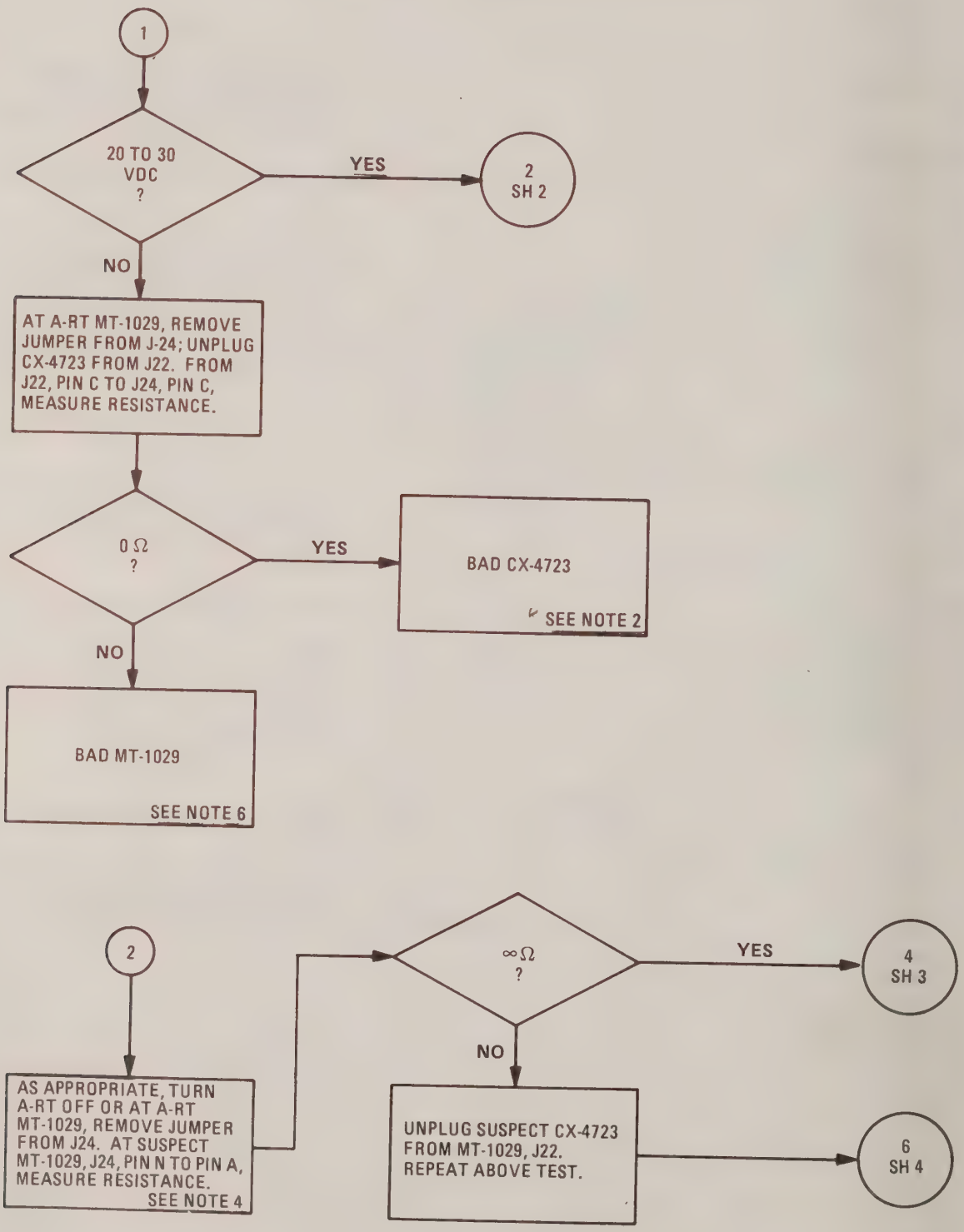


J24 OF MT-1029

5. For adverse A-RT, use P701; for adverse C-RT, use P702.
6. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

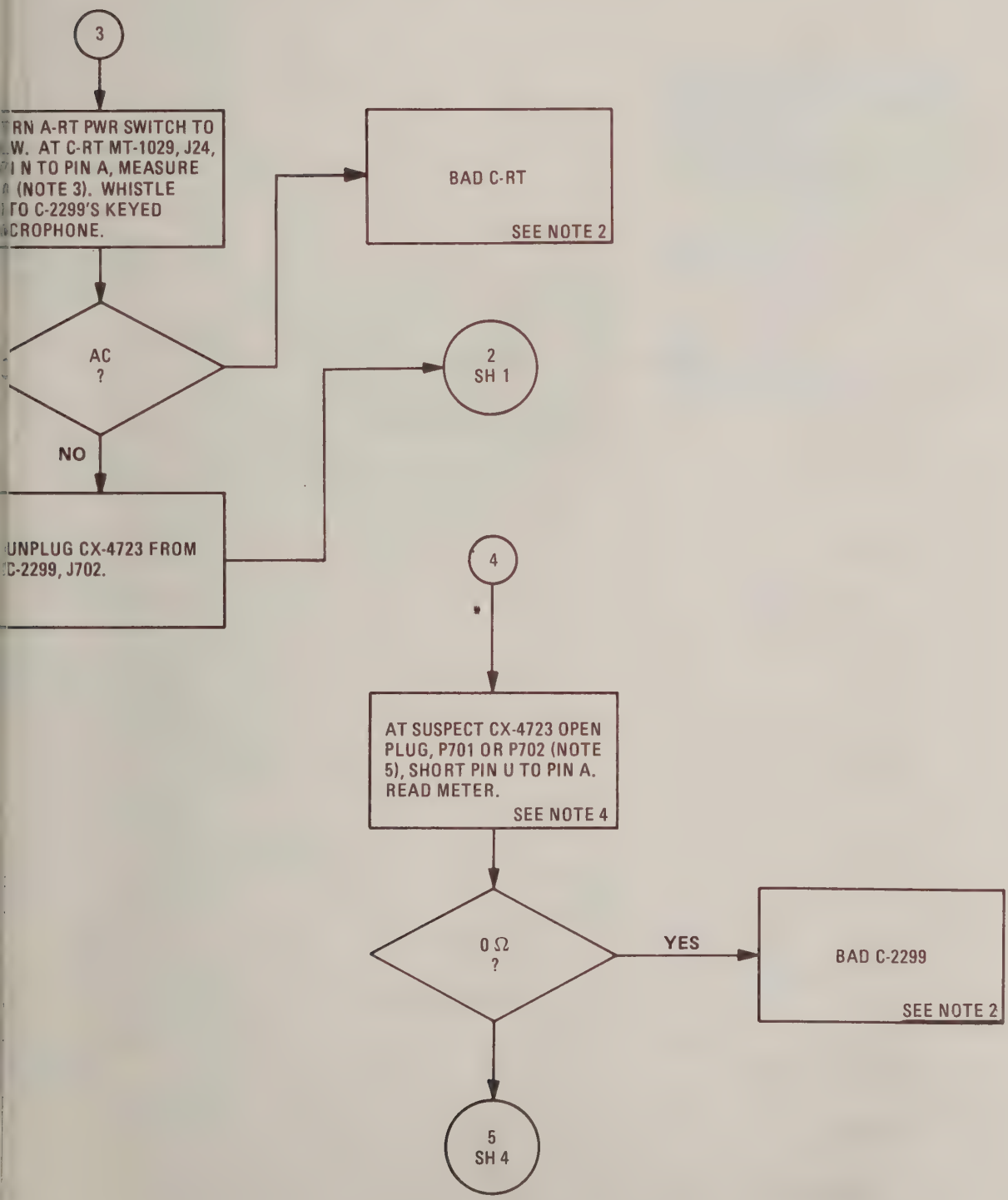
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 15
Troubleshoot C-2299 RT Modulation Circuit (Sheet 2 of 4)


1
20 TO 30 VDC ?
YES
2 SH 2
NO
AT A-RT MT-1029, REMOVE JUMPER FROM J-24; UNPLUG CX-4723 FROM J22. FROM J22, PIN C TO J24, PIN C, MEASURE RESISTANCE.
0 Ω ?
YES
BAD CX-4723
SEE NOTE 2
NO
BAD MT-1029
SEE NOTE 6
2
AS APPROPRIATE, TURN A-RT OFF OR AT A-RT MT-1029, REMOVE JUMPER FROM J24. AT SUSPECT MT-1029, J24, PIN N TO PIN A, MEASURE RESISTANCE.
SEE NOTE 4
∞Ω ?
YES
4 SH 3
NO
UNPLUG SUSPECT CX-4723 FROM MT-1029, J22. REPEAT ABOVE TEST.
6 SH 4

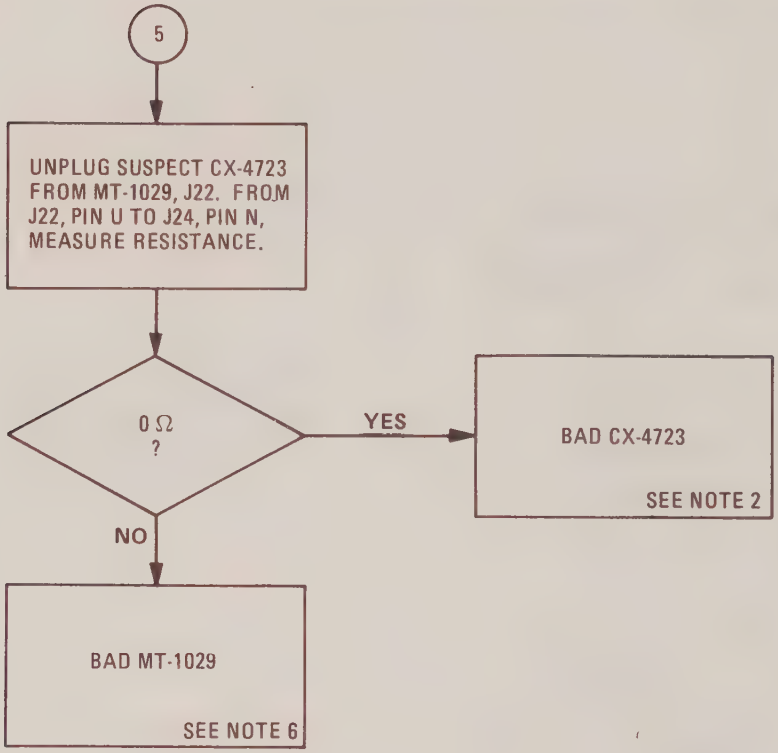
-2. TROUBLESHOOTING FLOW CHARTS. (CONT)

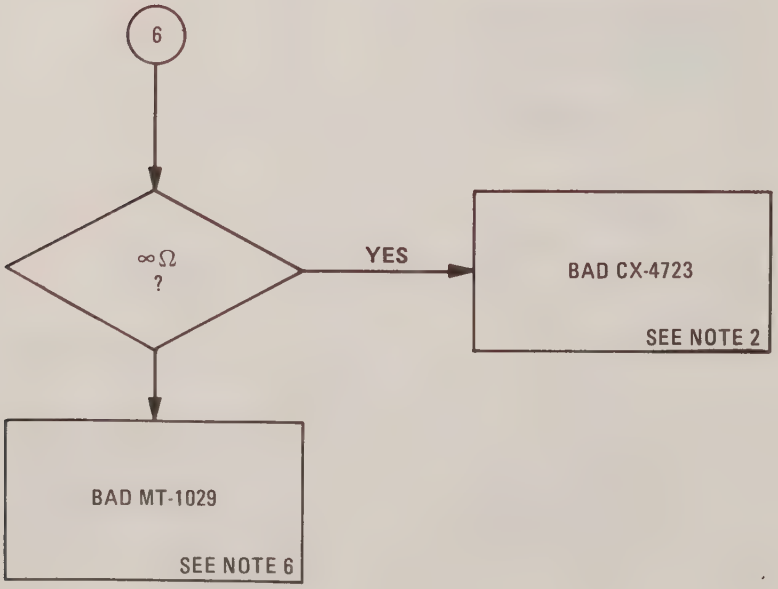
CHART 15
Troubleshoot C-2299 RT Modulation Circuit (Sheet 3 of 4)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 15
Troubleshoot C-2299 RT Modulation Circuit (Sheet 4 of 4)

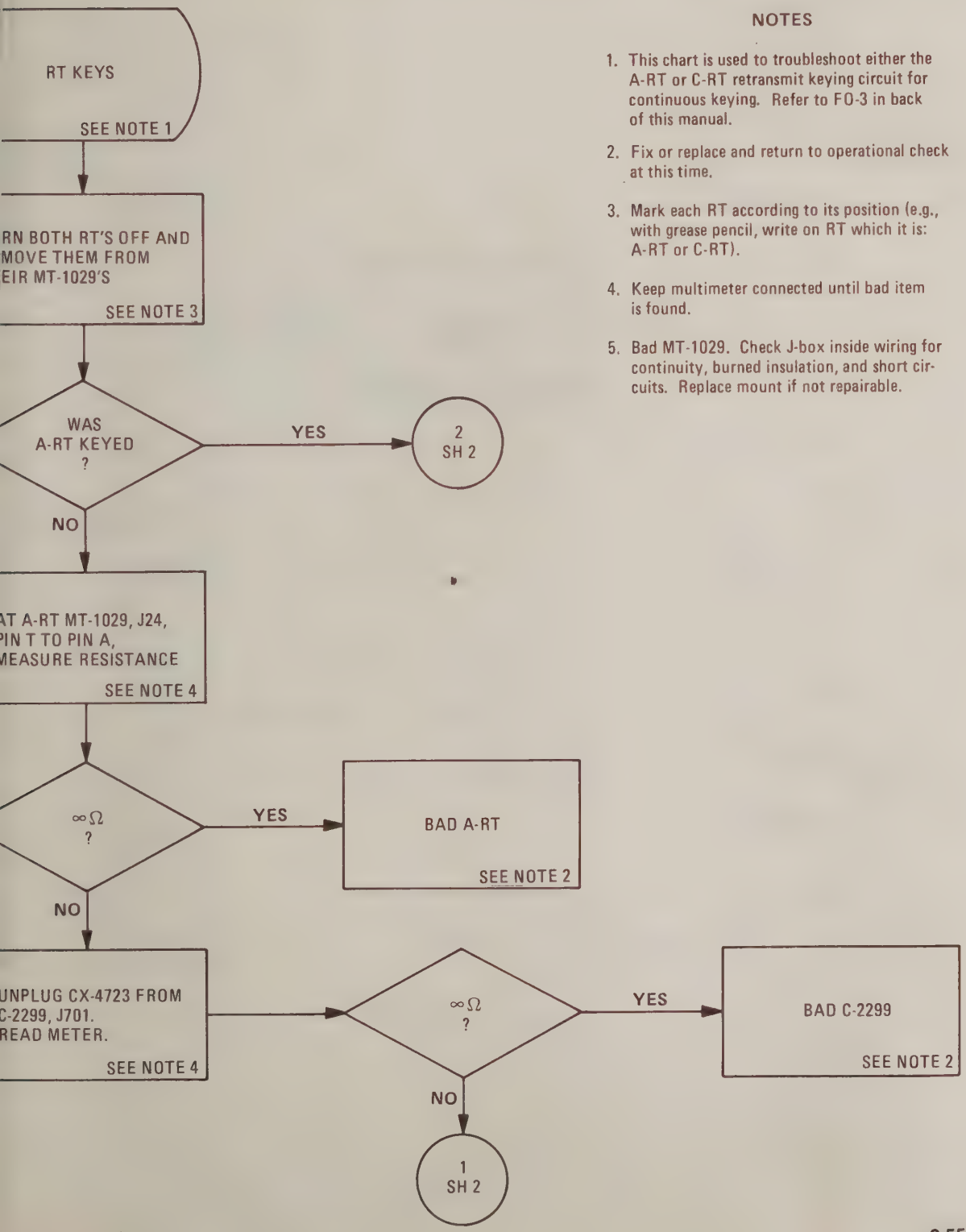




2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 16

Troubleshoot RT Retransmit Keying Circuit (Adverse Short) (Sheet 1 of 3)

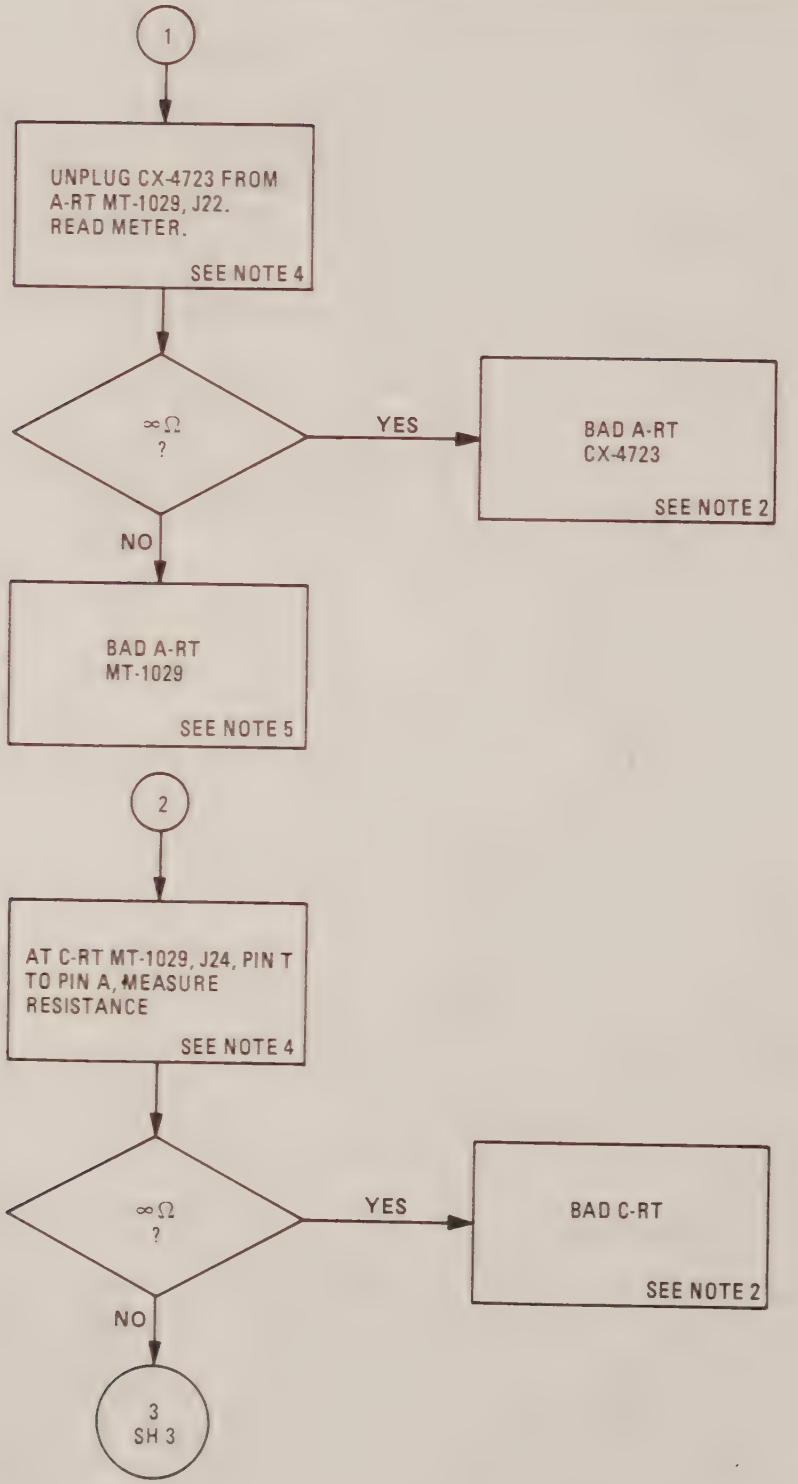


NOTES

1. This chart is used to troubleshoot either the A-RT or C-RT retransmit keying circuit for continuous keying. Refer to FO-3 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Mark each RT according to its position (e.g., with grease pencil, write on RT which it is: A-RT or C-RT).
4. Keep multimeter connected until bad item is found.
5. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

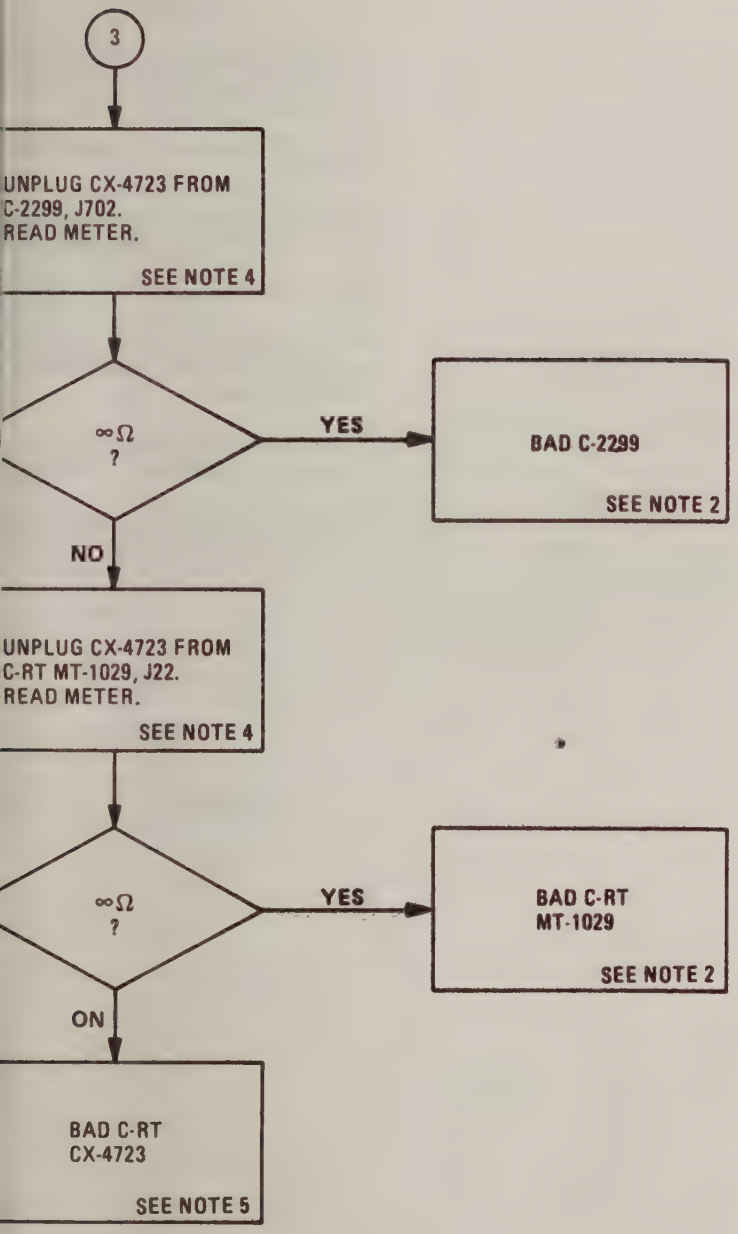
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 16
Troubleshoot RT Retransmit Keying Circuit (Adverse Short) (Sheet 2 of 3)



2. TROUBLESHOOTING FLOW CHARTS. (CONT)

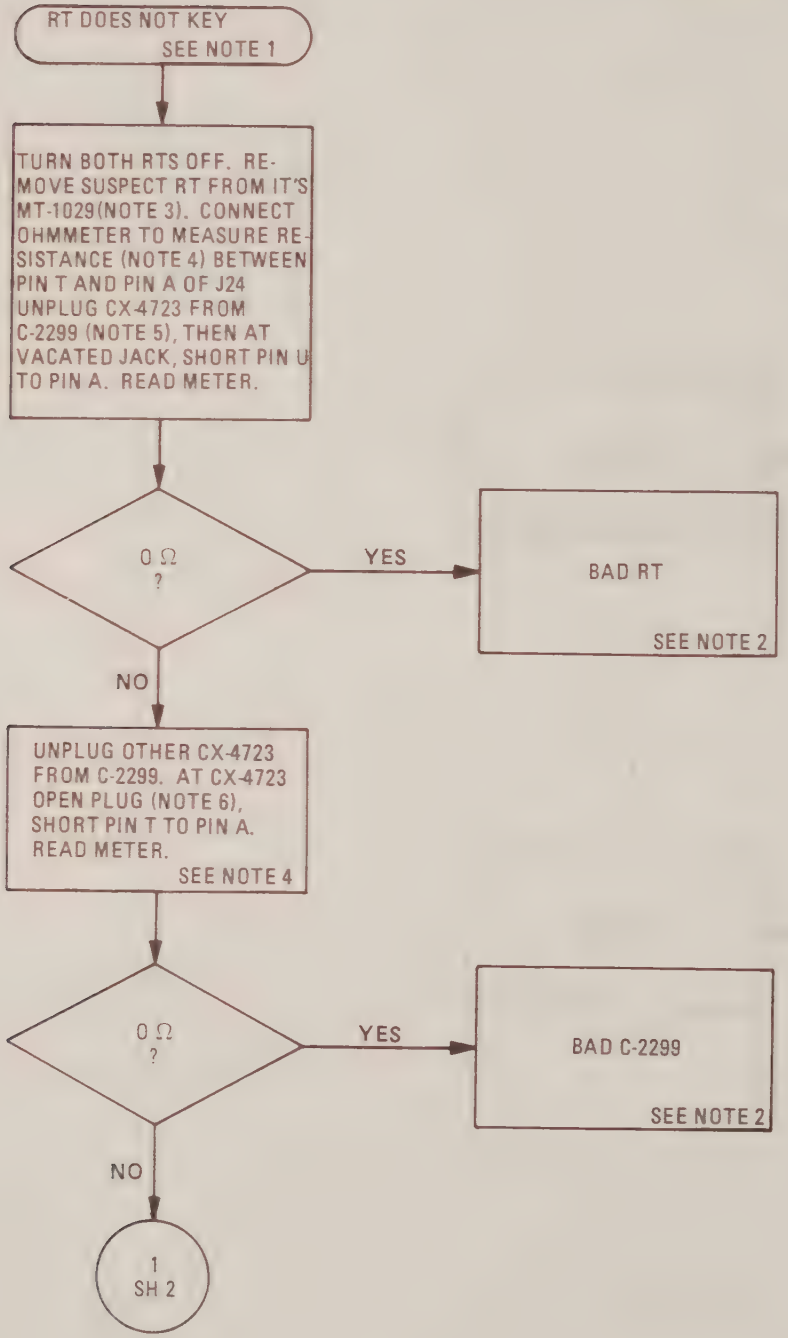
CHART 16
Troubleshoot RT Retransmit Keying Circuit (Adverse Short) (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 17

Troubleshoot RT Retransmit Keying Circuit (Adverse Open) (Sheet 1 of 2)

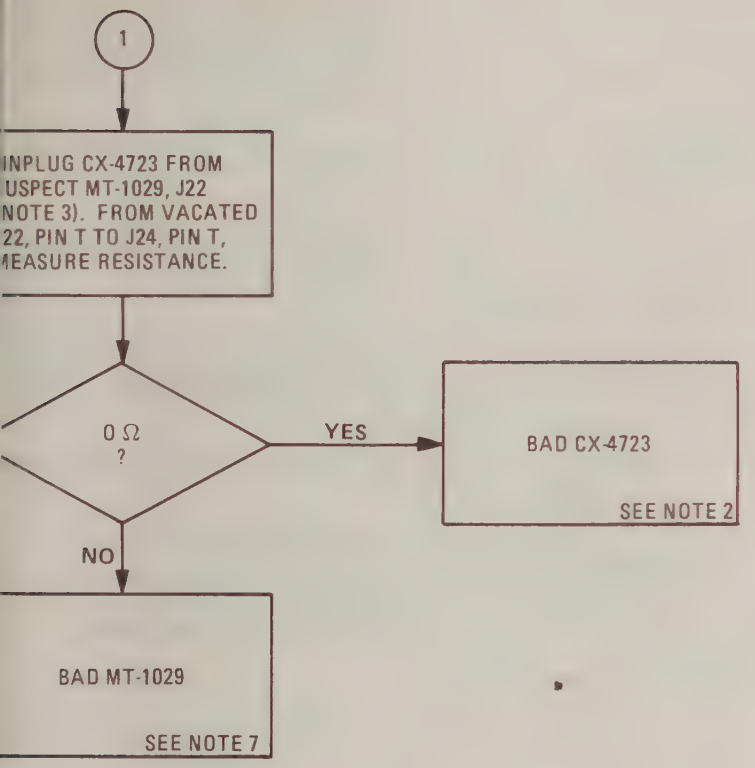

RT DOES NOT KEY
SEE NOTE 1
TURN BOTH RTS OFF. REMOVE SUSPECT RT FROM IT'S MT-1029(NOTE 3). CONNECT OHMMETER TO MEASURE RESISTANCE (NOTE 4) BETWEEN PIN T AND PIN A OF J24 UNPLUG CX-4723 FROM C-2299 (NOTE 5), THEN AT VACATED JACK, SHORT PIN U TO PIN A. READ METER.
0 Ω ?
YES
BAD RT
SEE NOTE 2
NO
UNPLUG OTHER CX-4723 FROM C-2299. AT CX-4723 OPEN PLUG (NOTE 6), SHORT PIN T TO PIN A. READ METER.
SEE NOTE 4
0 Ω ?
YES
BAD C-2299
SEE NOTE 2
NO
1
SH 2

NOTES

1. This chart is used to troubleshoot either A or C-RT retransmit keying circuit. Refer t FO-3 in back of this manual.
2. Fix or replace and return to operational ch at this time.
3. For operational check step 24b remove C-R for operational check step 24c remove A-R
4. Leave ohmmeter connected during test.
5. For operational check step 24b, unplug P7 and use J701. For operational check step 2 unplug P702 and J702.
6. For operational check step 24b, use plug P for operational check step 24c, use plug P7
7. Bad MT-1029. Check J-box inside wiring fo continuity, burned insulation, and short cir cuits. Replace mount if not repairable.

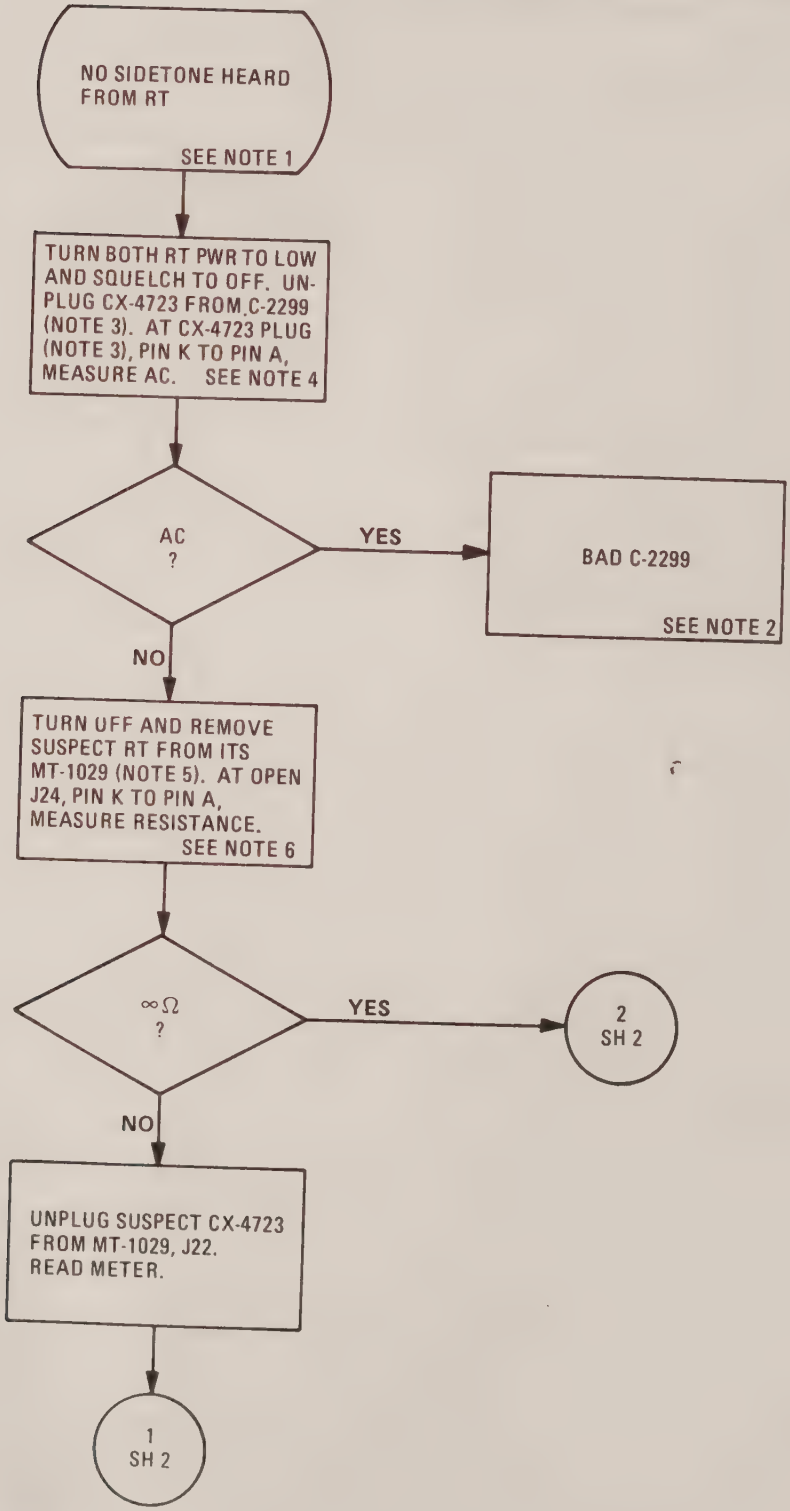
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 17
Troubleshoot RT Retransmit Keying Circuit (Adverse Open) (Sheet 2 of 2)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 18
Troubleshoot Retransmit Modulation Circuit (Sheet 1 of 3)

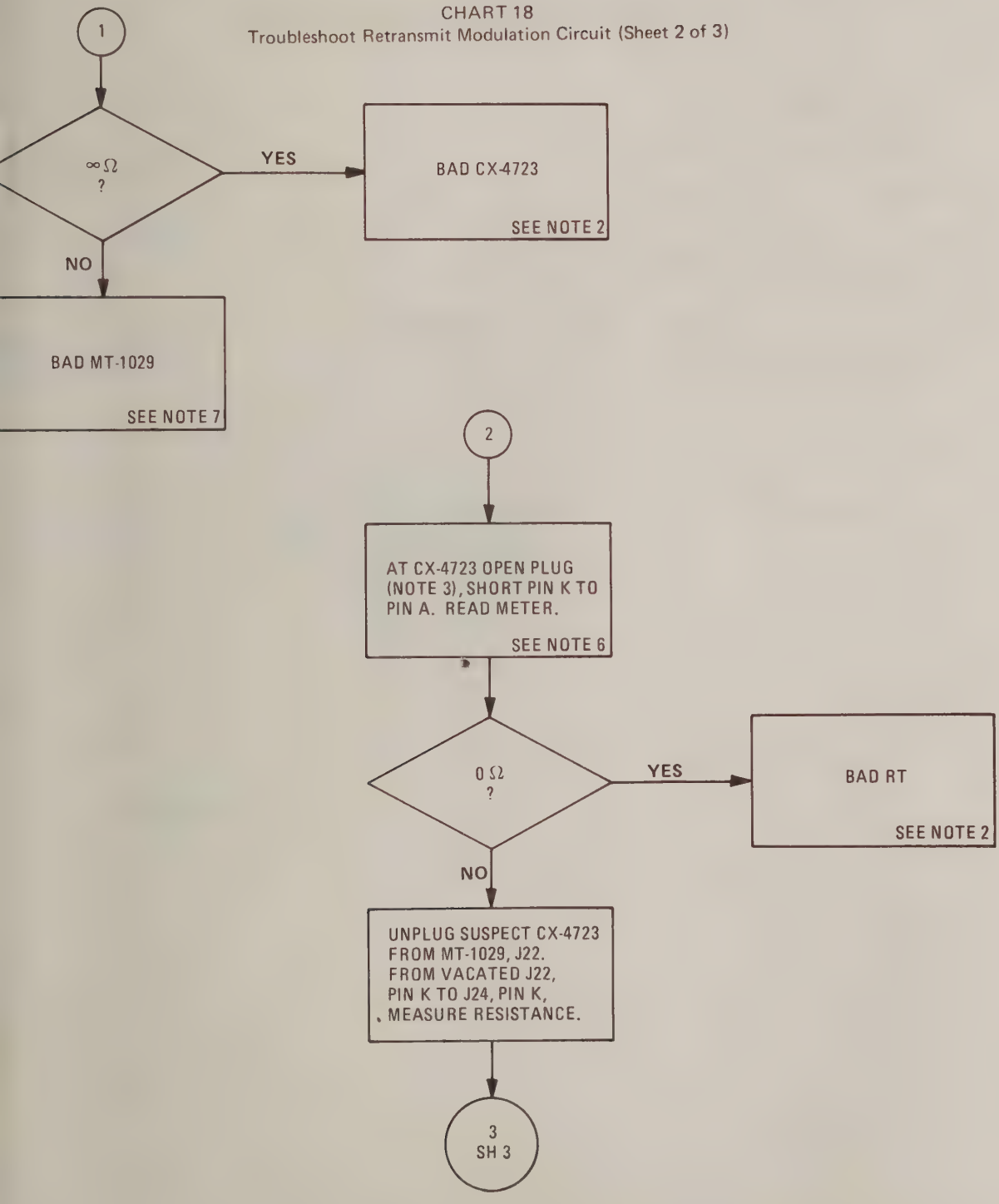

NO SIDETONE HEARD FROM RT
SEE NOTE 1
TURN BOTH RT PWR TO LOW AND SQUELCH TO OFF. UNPLUG CX-4723 FROM C-2299 (NOTE 3). AT CX-4723 PLUG (NOTE 3), PIN K TO PIN A, MEASURE AC. SEE NOTE 4
AC ?
YES
BAD C-2299
SEE NOTE 2
NO
TURN OFF AND REMOVE SUSPECT RT FROM ITS MT-1029 (NOTE 5). AT OPEN J24, PIN K TO PIN A, MEASURE RESISTANCE. SEE NOTE 6
∞Ω ?
YES
2 SH 2
NO
UNPLUG SUSPECT CX-4723 FROM MT-1029, J22. READ METER.
1 SH 2

NOTES

1. This chart is used to troubleshoot either the A-RT (operational check step 24b) or the C-RT (operational check step 24c) retransmit modulation circuit. Refer to FO-3 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. For operational check step 24b, unplug CX-4723 from J702 and use plug P702. For operational check step 24c, unplug CX-4723 from J701 and use plug P701.
4. To measure AC, set up multimeter as AC voltmeter on its lowest range (TS-352, 2.5 VAC), then connect to plug (note 3) between pin K and pin A.
5. For step 24b, remove C-RT; for step 24c, remove A-RT.
6. Keep ohmmeter connected for next test.
7. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

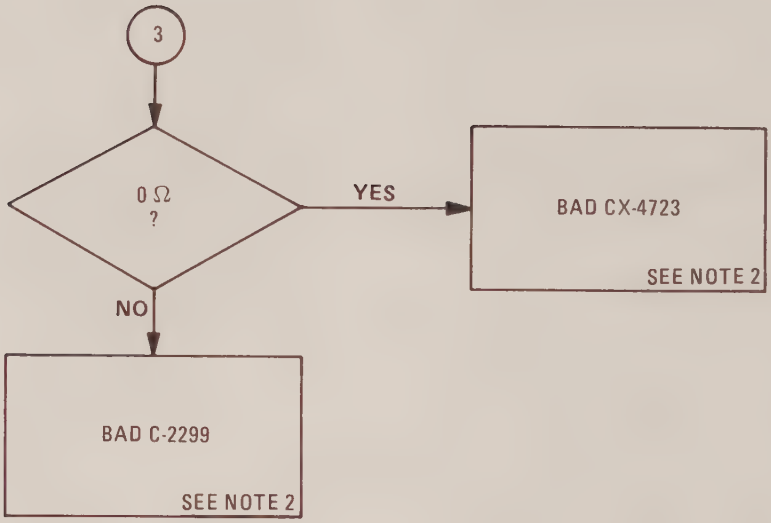
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 18
Troubleshoot Retransmit Modulation Circuit (Sheet 2 of 3)



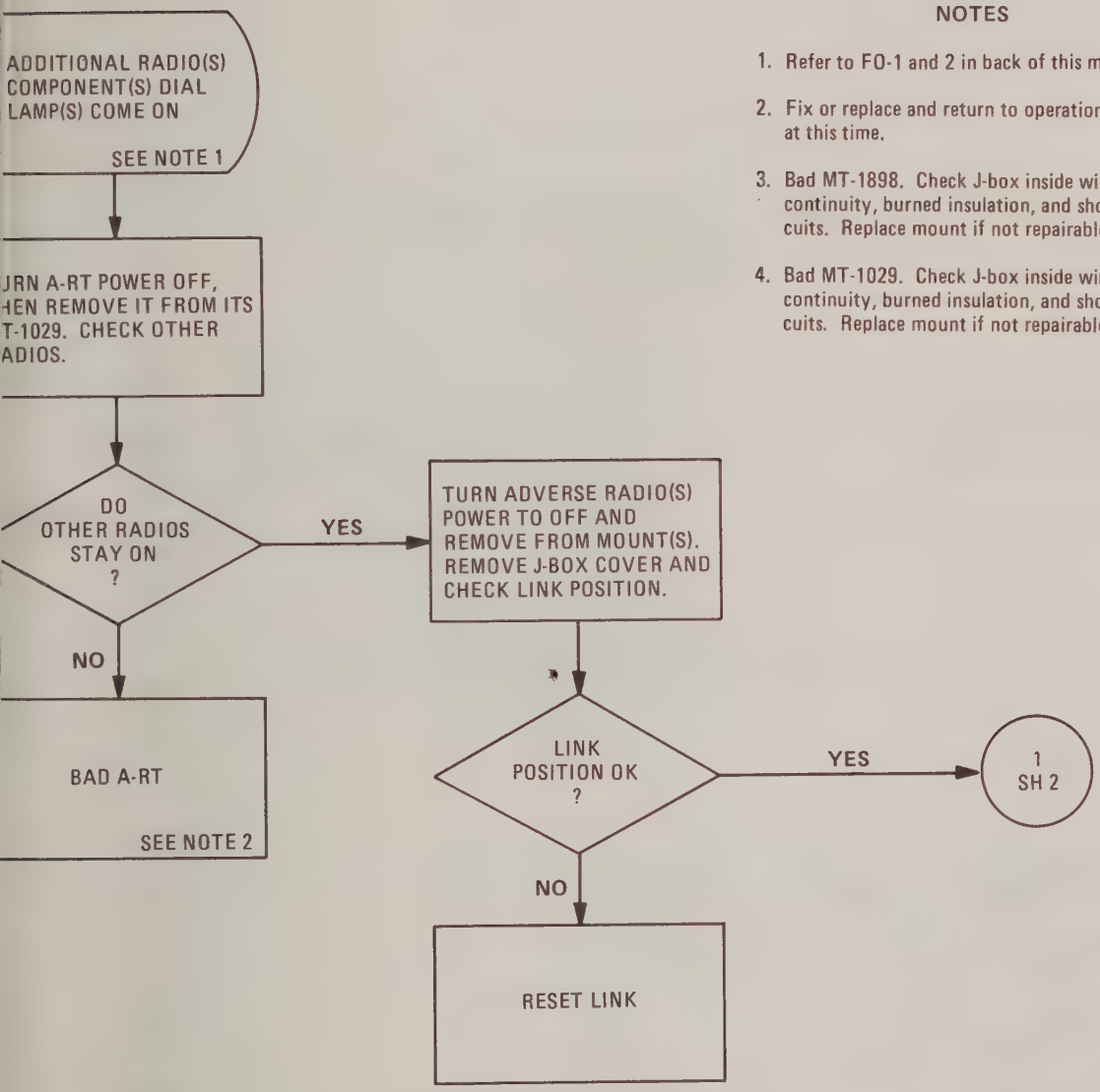
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 18
Troubleshoot Retransmit Modulation Circuit (Sheet 3 of 3)



2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 19
Troubleshoot Remote Power Control (Sheet 1 of 3)

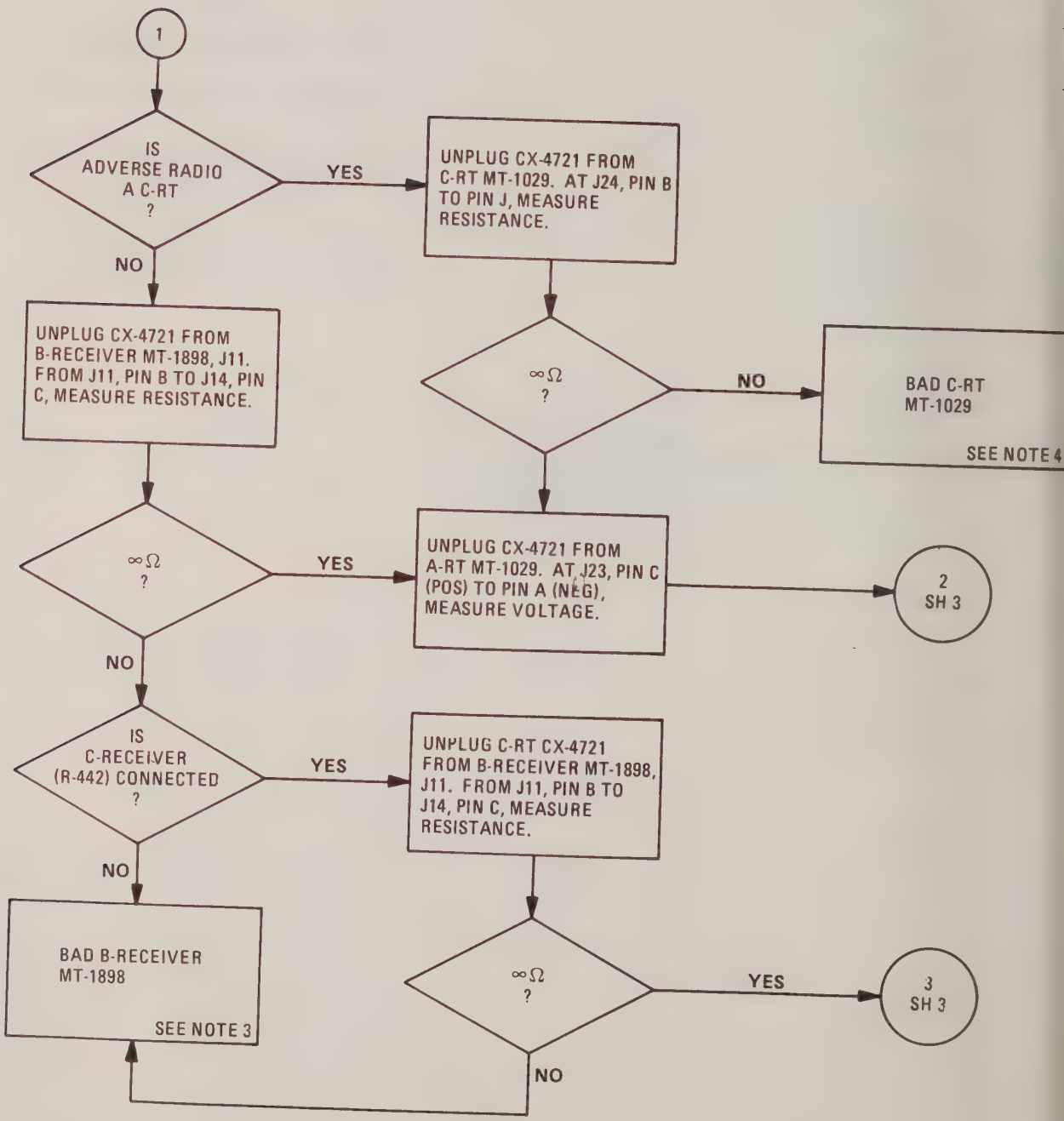

ADDITIONAL RADIO(S) COMPONENT(S) DIAL LAMP(S) COME ON
SEE NOTE 1
URN A-RT POWER OFF, HEN REMOVE IT FROM ITS T-1029. CHECK OTHER ADIOS.
DO OTHER RADIOS STAY ON ?
YES
TURN ADVERSE RADIO(S) POWER TO OFF AND REMOVE FROM MOUNT(S). REMOVE J-BOX COVER AND CHECK LINK POSITION.
NO
BAD A-RT
SEE NOTE 2
LINK POSITION OK ?
YES
1 SH 2
NO
RESET LINK

NOTES

1. Refer to FO-1 and 2 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Bad MT-1898. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.
4. Bad MT-1029. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

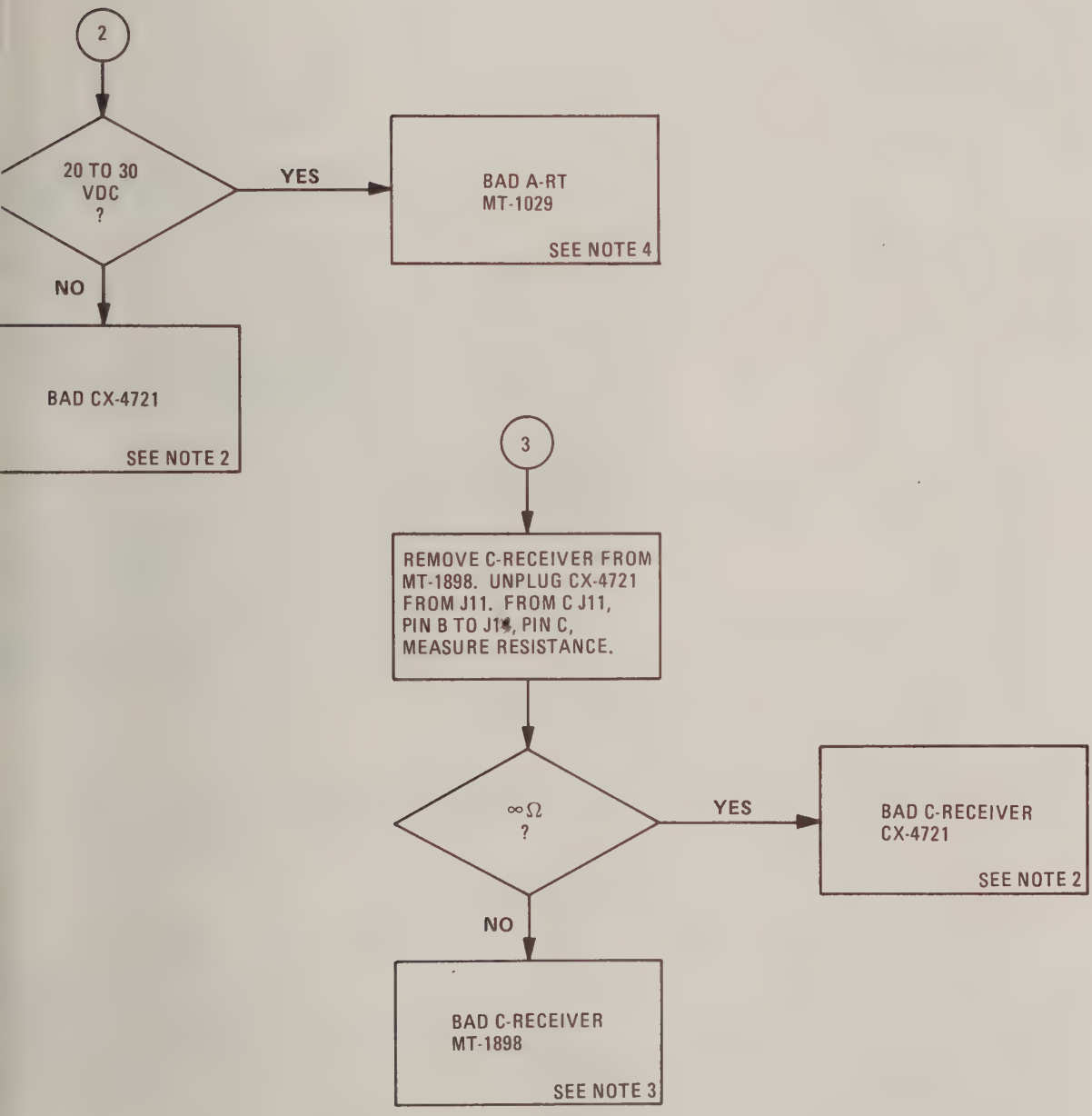
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 19
Troubleshoot Remote Power Control (Sheet 2 of 3)


1
IS ADVERSE RADIO A C-RT ?
YES
NO
UNPLUG CX-4721 FROM C-RT MT-1029. AT J24, PIN B TO PIN J, MEASURE RESISTANCE.
UNPLUG CX-4721 FROM B-RECEIVER MT-1898, J11. FROM J11, PIN B TO J14, PIN C, MEASURE RESISTANCE.
∞Ω ?
NO
BAD C-RT MT-1029
SEE NOTE 4
∞Ω ?
YES
UNPLUG CX-4721 FROM A-RT MT-1029. AT J23, PIN C (POS) TO PIN A (NEG), MEASURE VOLTAGE.
2 SH 3
NO
IS C-RECEIVER (R-442) CONNECTED ?
YES
NO
UNPLUG C-RT CX-4721 FROM B-RECEIVER MT-1898, J11. FROM J11, PIN B TO J14, PIN C, MEASURE RESISTANCE.
BAD B-RECEIVER MT-1898
SEE NOTE 3
∞Ω ?
YES
3 SH 3
NO

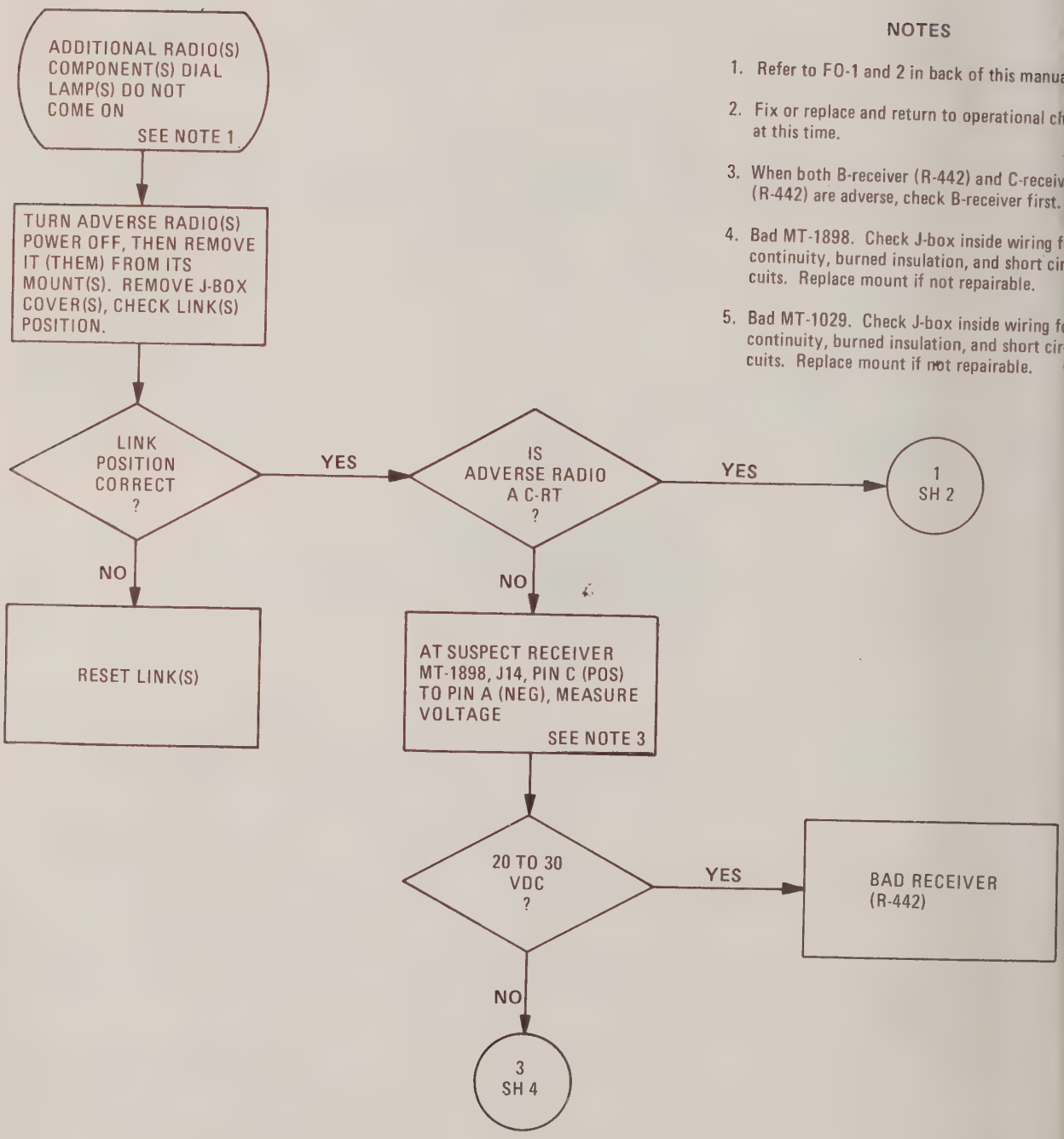
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 19
Troubleshoot Remote Power Control (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 20
Troubleshoot Remote Power Control (Sheet 1 of 4)


ADDITIONAL RADIO(S) COMPONENT(S) DIAL LAMP(S) DO NOT COME ON
SEE NOTE 1
TURN ADVERSE RADIO(S) POWER OFF, THEN REMOVE IT (THEM) FROM ITS MOUNT(S). REMOVE J-BOX COVER(S), CHECK LINK(S) POSITION.
LINK POSITION CORRECT ?
YES
NO
RESET LINK(S)
IS ADVERSE RADIO A C-RT ?
YES
1 SH 2
NO
AT SUSPECT RECEIVER MT-1898, J14, PIN C (POS) TO PIN A (NEG), MEASURE VOLTAGE
SEE NOTE 3
20 TO 30 VDC ?
YES
BAD RECEIVER (R-442)
NO
3 SH 4

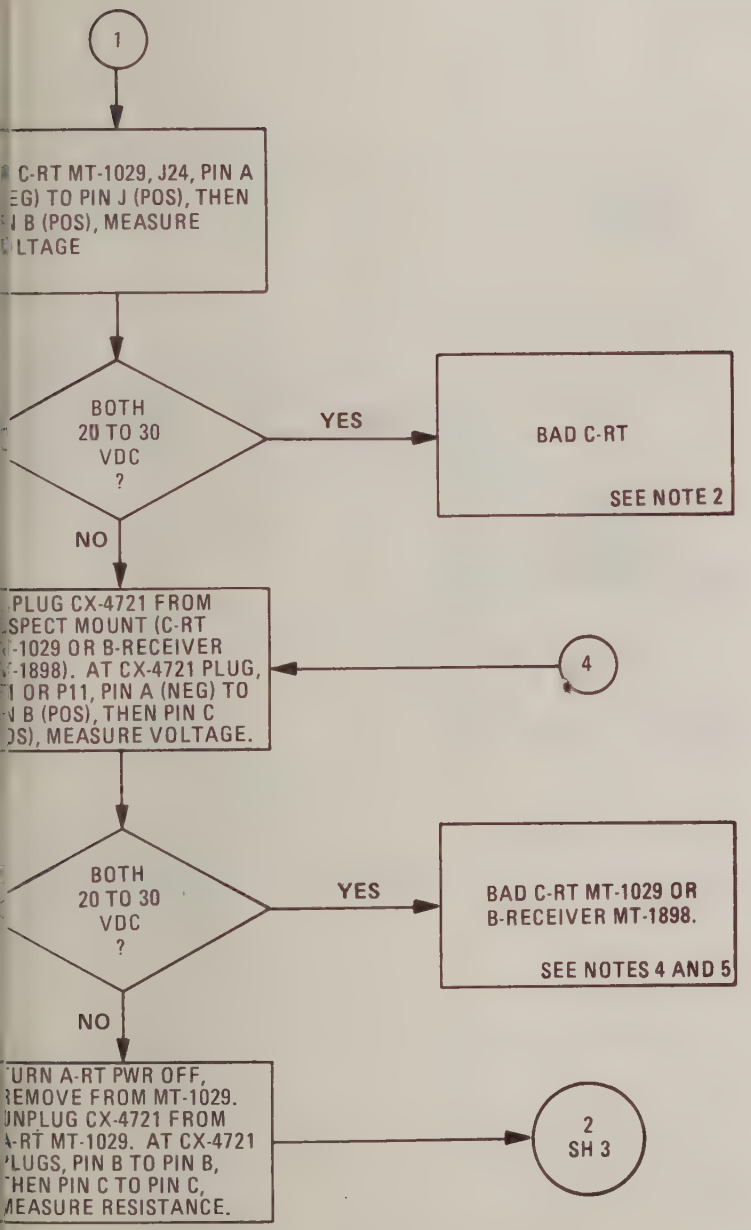
NOTES

1. Refer to FO-1 and 2 in back of this manual
2. Fix or replace and return to operational che at this time.
3. When both B-receiver (R-442) and C-receive (R-442) are adverse, check B-receiver first.
4. Bad MT-1898. Check J-box inside wiring fo continuity, burned insulation, and short cir- cuits. Replace mount if not repairable.
5. Bad MT-1029. Check J-box inside wiring fo continuity, burned insulation, and short cir- cuits. Replace mount if not repairable.

1. TROUBLESHOOTING FLOW CHARTS. (CONT)

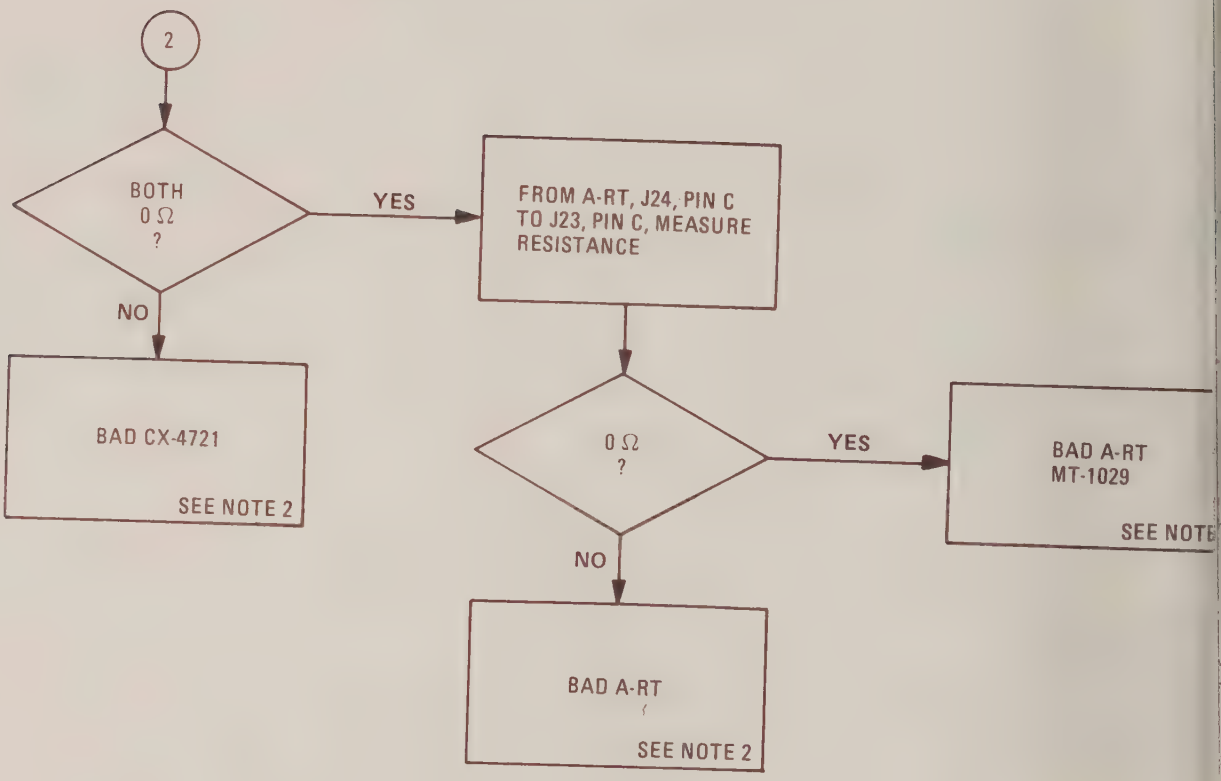
CHART 20

Troubleshoot Remote Power Control (Sheet 2 of 4)



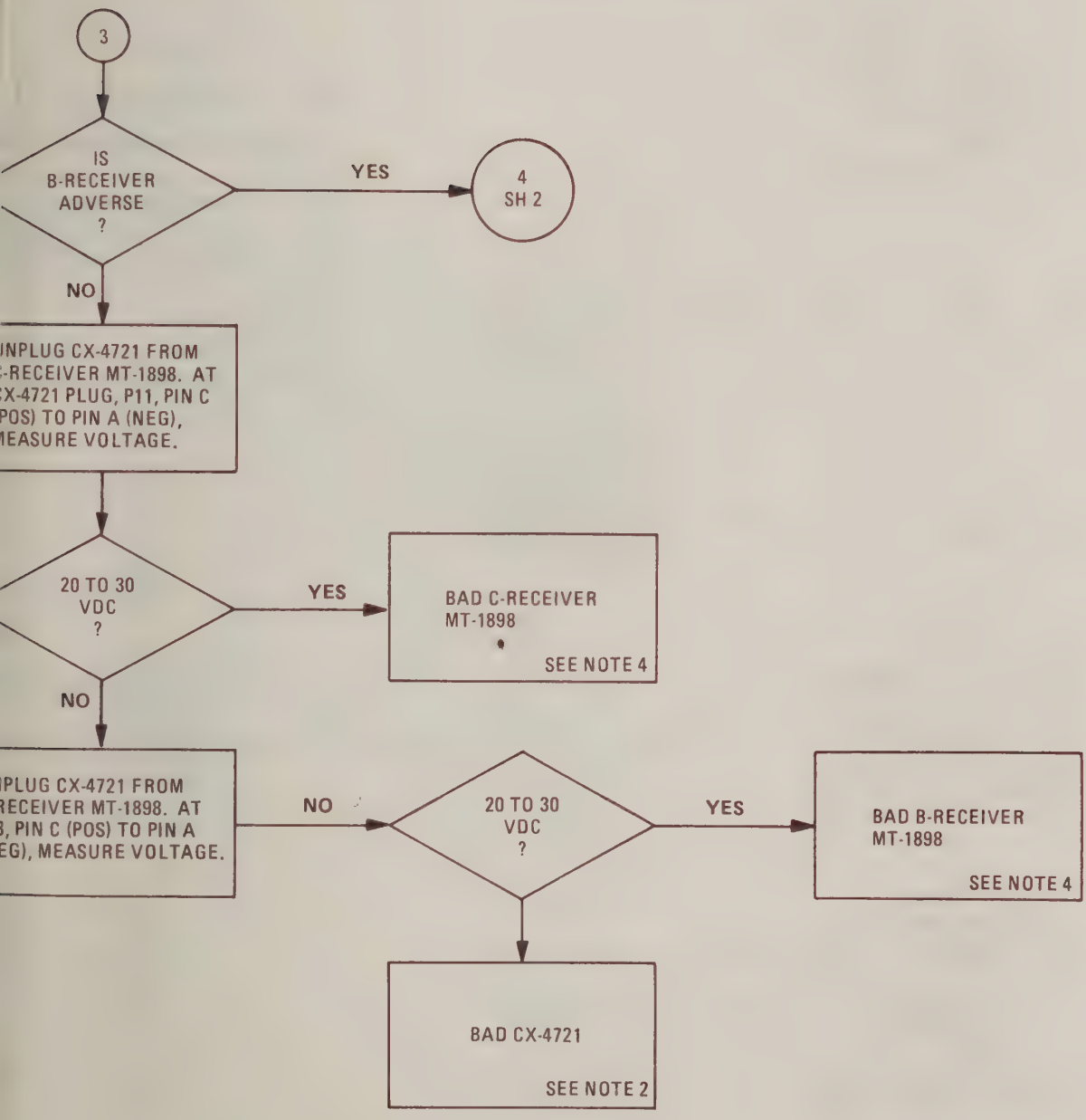
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 20
Troubleshoot Remote Power Control (Sheet 3 of 4)



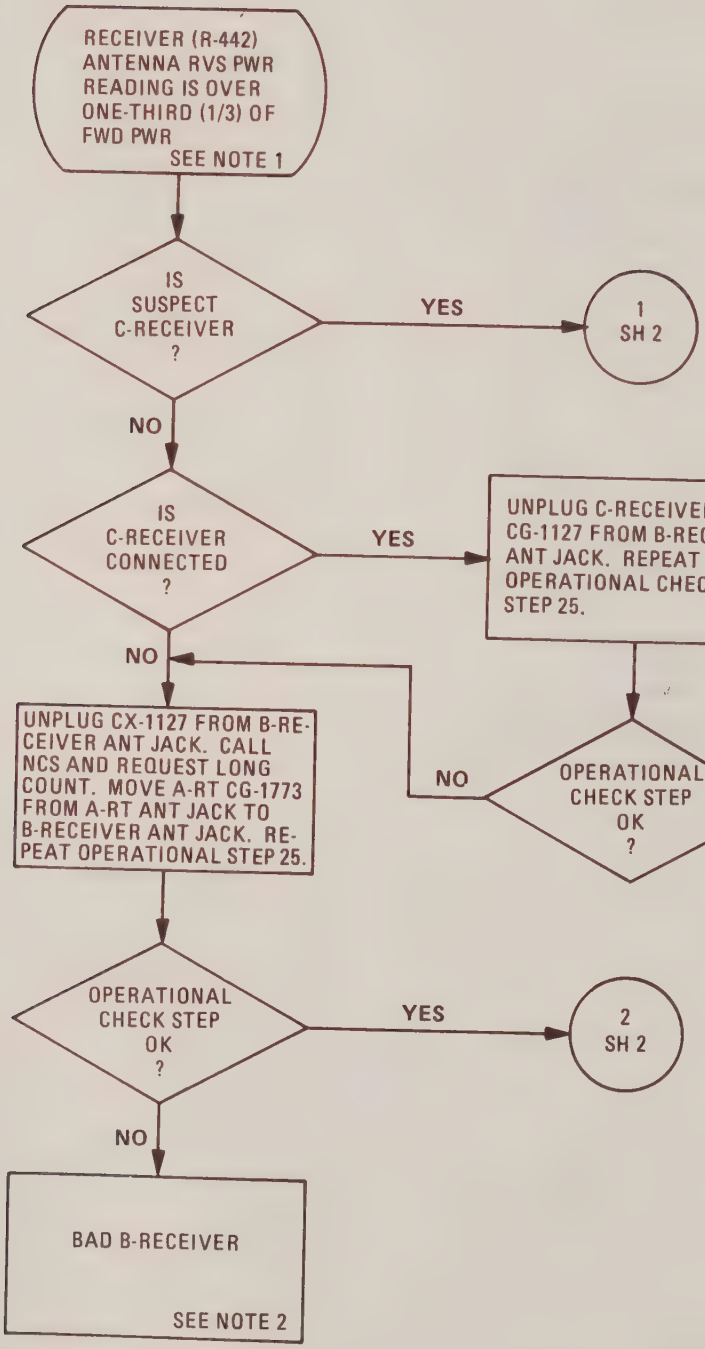
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 20
Troubleshoot Remote Power Control (Sheet 4 of 4)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 21
Troubleshoot Receiver (R-442) Antenna Circuit (Sheet 1 of 3)


RECEIVER (R-442) ANTENNA RVS PWR READING IS OVER ONE-THIRD (1/3) OF FWD PWR
SEE NOTE 1
IS SUSPECT C-RECEIVER ?
YES
1 SH 2
NO
IS C-RECEIVER CONNECTED ?
YES
UNPLUG C-RECEIVER CG-1127 FROM B-RECEIVER ANT JACK. REPEAT OPERATIONAL CHECK STEP 25.
NO
UNPLUG CX-1127 FROM B-RECEIVER ANT JACK. CALL NCS AND REQUEST LONG COUNT. MOVE A-RT CG-1773 FROM A-RT ANT JACK TO B-RECEIVER ANT JACK. REPEAT OPERATIONAL STEP 25.
NO
OPERATIONAL CHECK STEP OK ?
YES
UNPLUG C-RECEIVER CG-1127 FROM C-RECEIVER'S ANT JACK. PERFORM RF CABLE CONTINUITY TEST.
SEE NOTE 3
OPERATIONAL CHECK STEP OK ?
YES
2 SH 2
NO
BAD B-RECEIVER
SEE NOTE 2
3 SH 3

NOTES

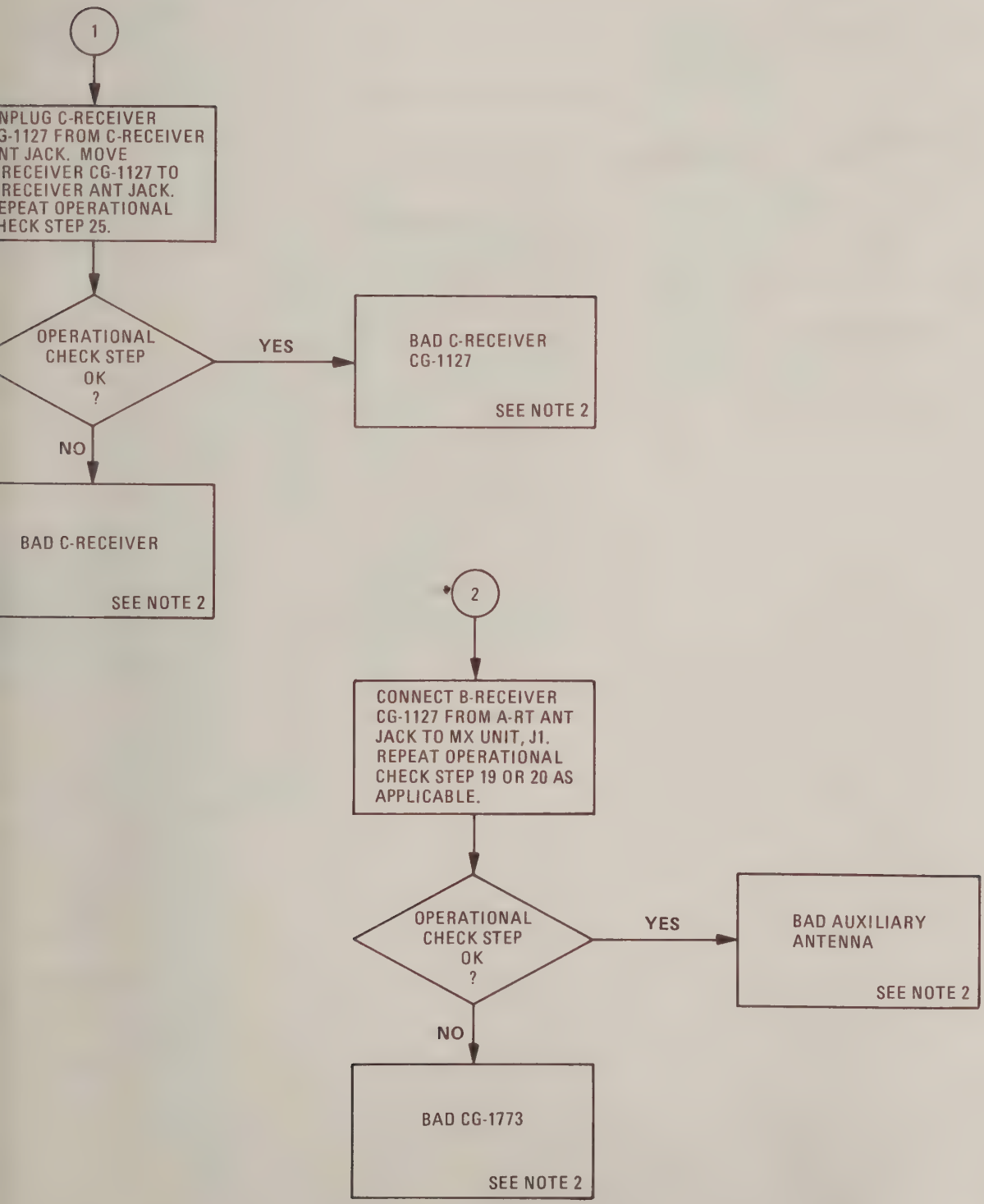
1. Refer to FO-2 in back of this manual.
2. Fix or replace and return to operational chec at this time.
3. Perform RF continuity check as follows:

Measure Resistance	Should be
Center pin to center pin	0 Ω
Plug collar to plug collar	0 Ω
Center pin to plug collar	∞ Ω

Also perform a visual check of the antenna.

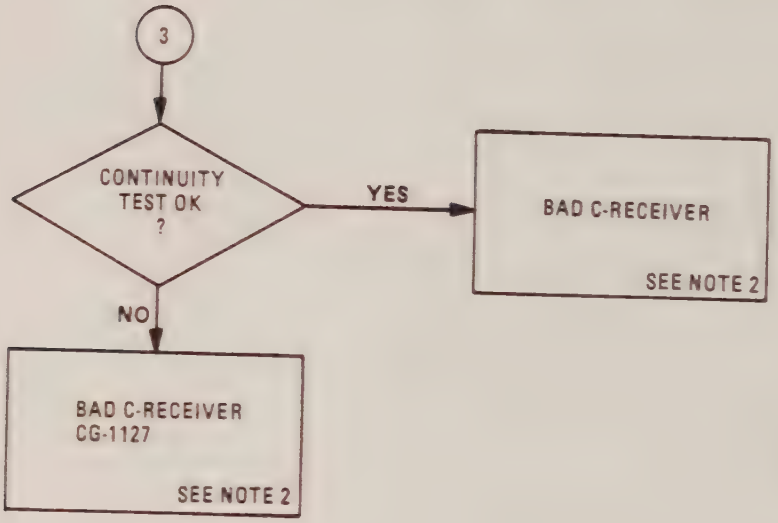
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 21
Troubleshoot Receiver (R-442) Antenna Circuit (Sheet 2 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

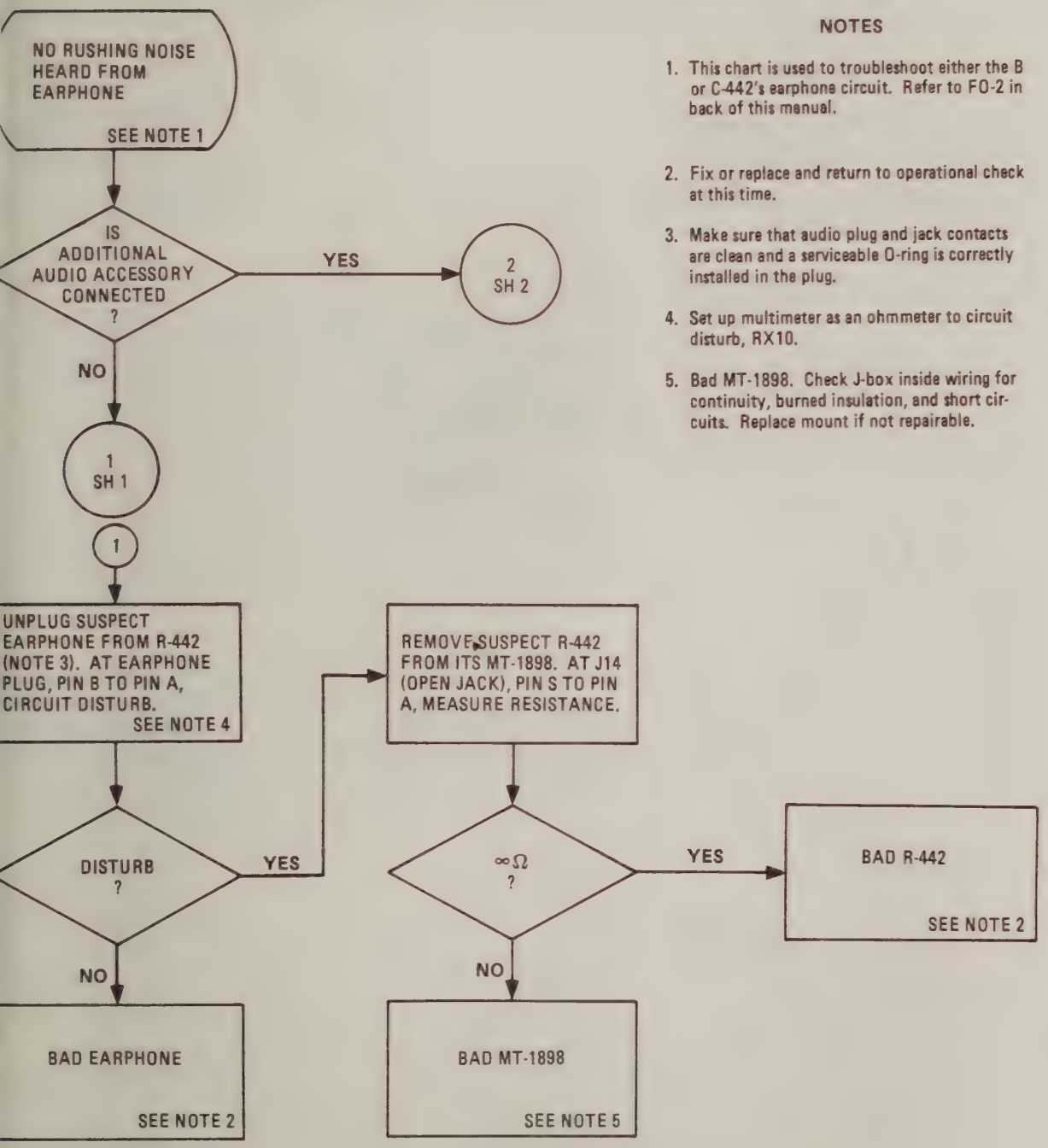
CHART 21
Troubleshoot Receiver (R-442) Antenna Circuit (Sheet 3 of 3)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 22

Troubleshoot R-442's Earphone Audio Circuit (Sheet 1 of 2)

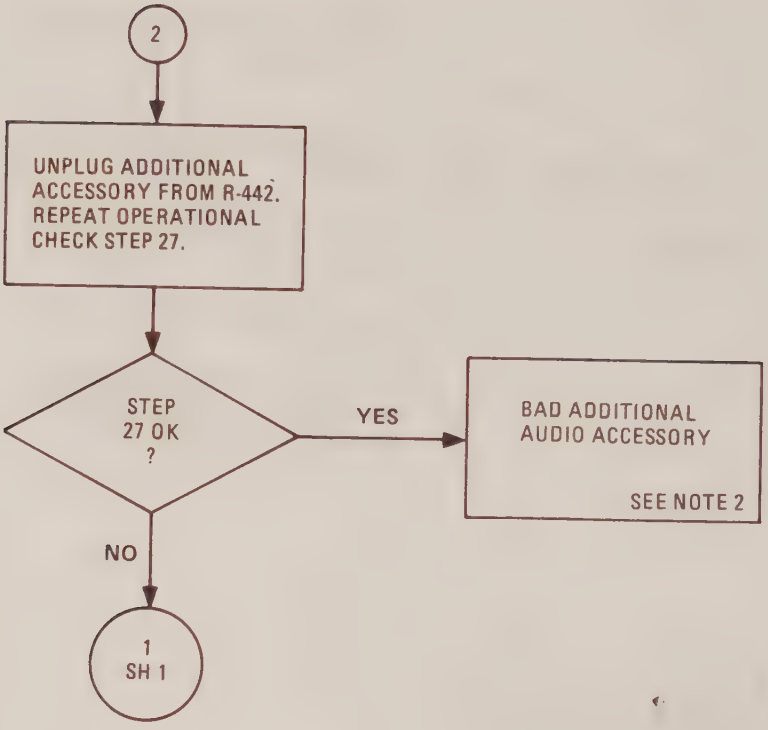


NOTES

1. This chart is used to troubleshoot either the B or C-442's earphone circuit. Refer to FO-2 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Make sure that audio plug and jack contacts are clean and a serviceable O-ring is correctly installed in the plug.
4. Set up multimeter as an ohmmeter to circuit disturb, RX10.
5. Bad MT-1898. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

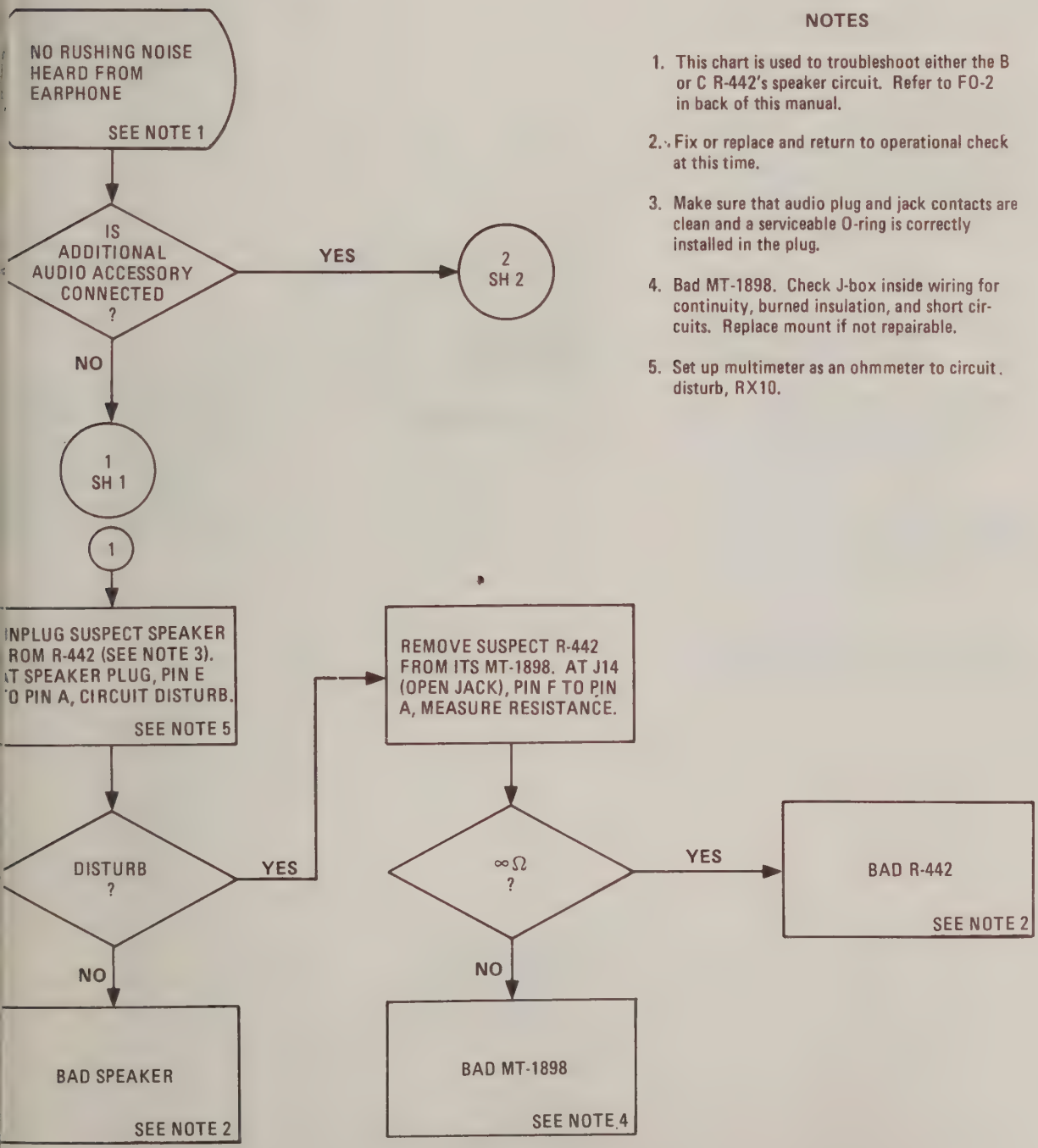
CHART 22
Troubleshoot R-442's Earphone Audio Circuit (Sheet 2 of 2)



12. **TROUBLESHOOTING FLOW CHARTS.** (CONT)

CHART 23

Troubleshoot R-442's Speaker Audio Circuit (Sheet 1 of 2)

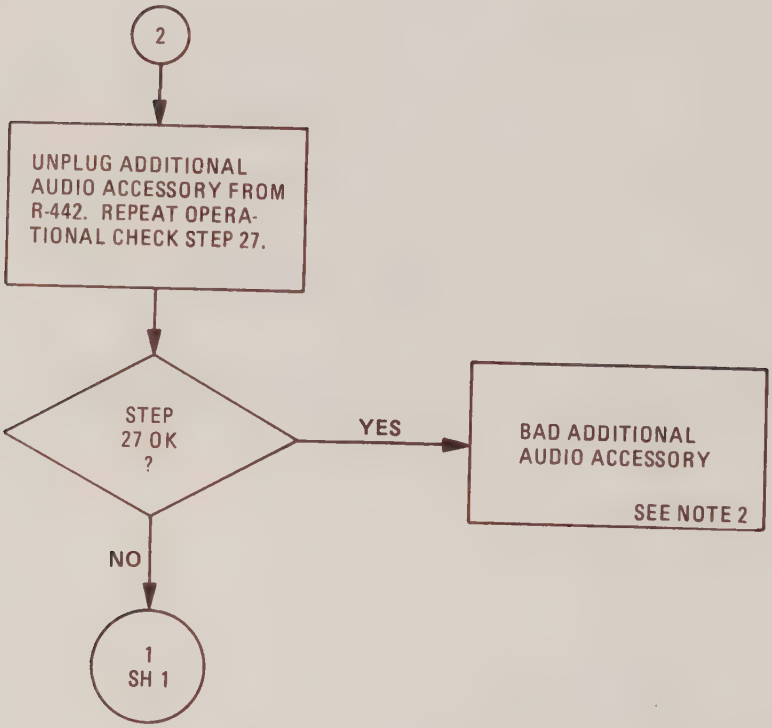


NOTES

1. This chart is used to troubleshoot either the B or C R-442's speaker circuit. Refer to FO-2 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. Make sure that audio plug and jack contacts are clean and a serviceable O-ring is correctly installed in the plug.
4. Bad MT-1898. Check J-box inside wiring for continuity, burned insulation, and short circuits. Replace mount if not repairable.
5. Set up multimeter as an ohmmeter to circuit disturb, RX10.

3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

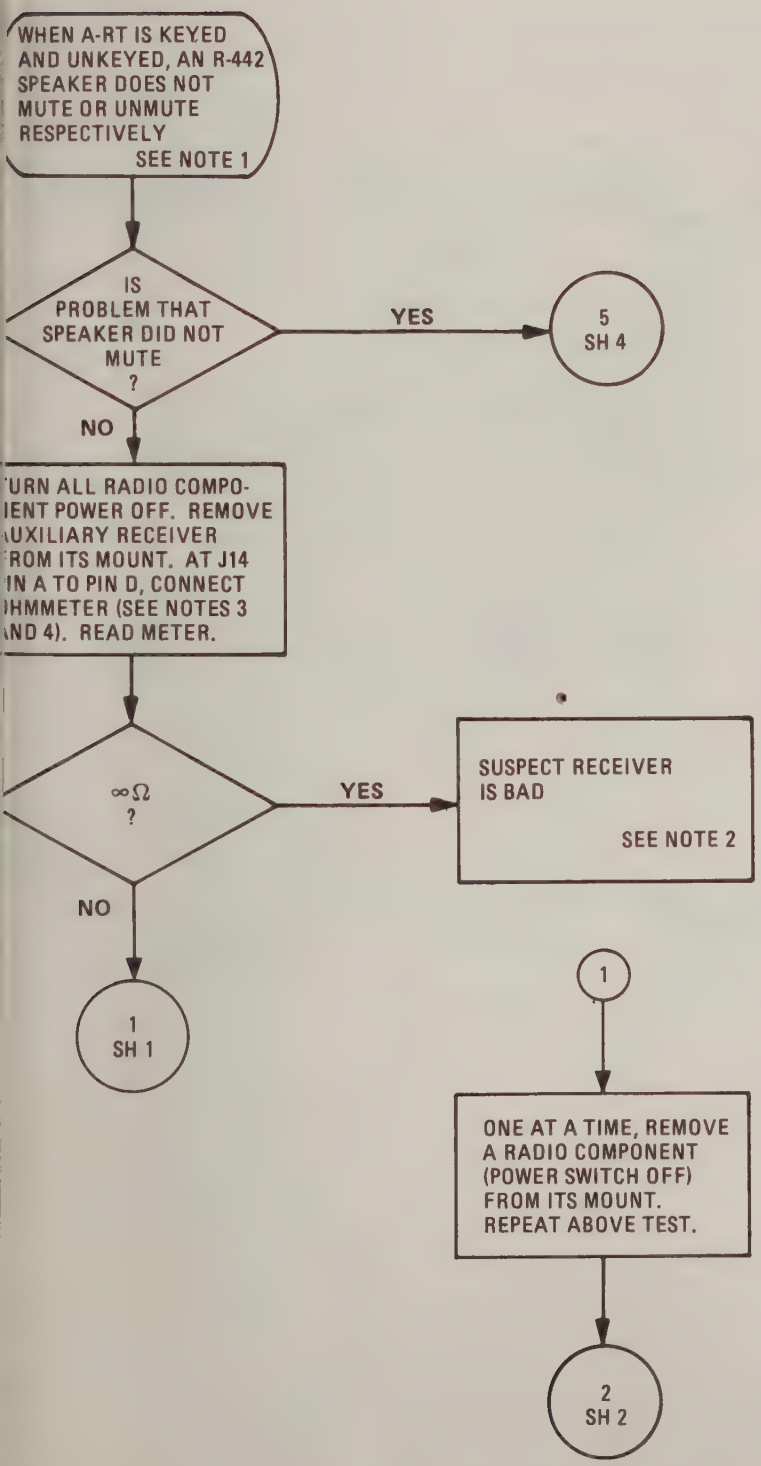
CHART 23
Troubleshoot R-442's Speaker Audio Circuit (Sheet 2 of 2)



-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24

Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 1 of 7)

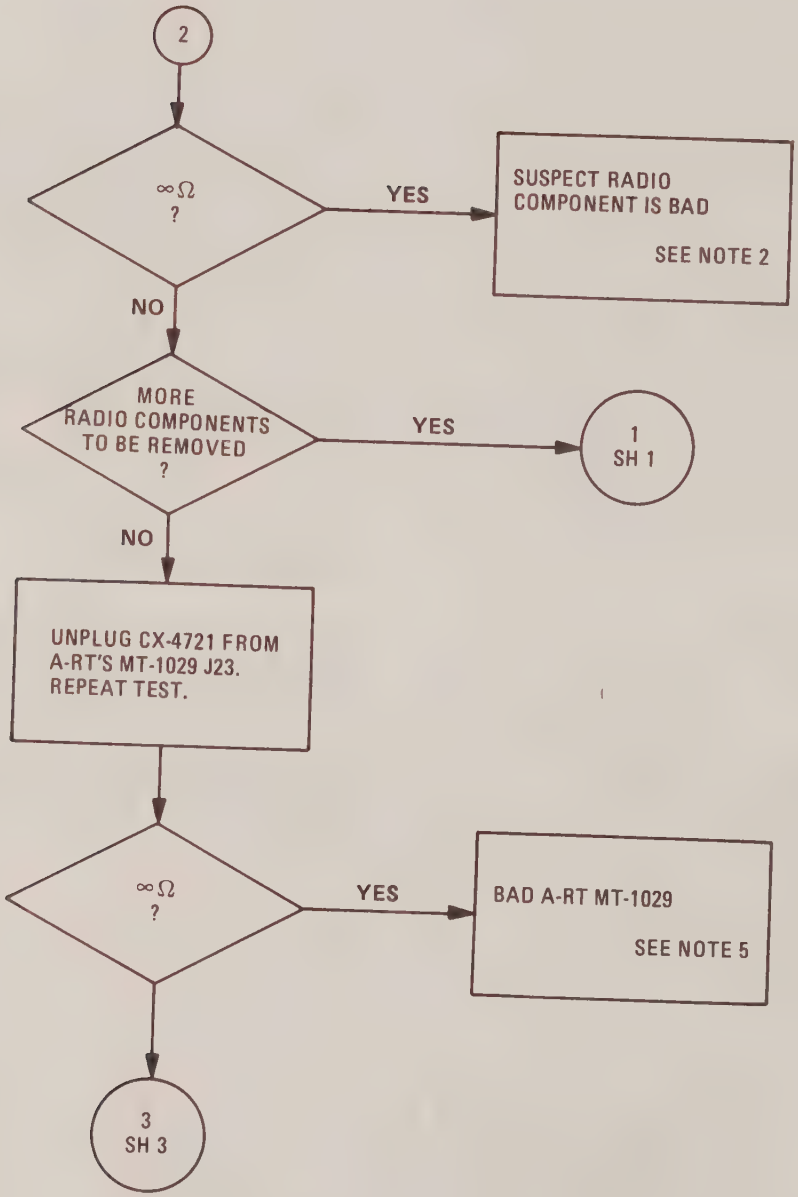


NOTES

1. Refer to FO-2 in back of this manual.
2. Fix or replace and return to operational check at this time.
3. When there are both a B- and C-receiver (AN/VRC-44 and -48), connect multimeter (set up for OHMS, R X 1K) to J14 of the C-receivers mount as prescribed by note 4.
4. Because of CR21 in A-RT's mount positive (+) meter probe is connected to J14 pin D and negative (–) meter probe to J14 pin A. For a TS-352, "ohms" probe is negative (–) and "common" probe is positive (+).
5. Inside adverse mounts J-box check wiring from J24 (MT-1029) or J14 (MT-1898) pin D to J21 and J23 (MT-1029) or J11 and J13 (MT-1898) pin D for adverse shorts. Afterwards, see note 2.
6. When both the B- and C-receivers won't mute, check the B-receiver first. Connect multimeter (set up for OHMS, R X 1K) to J14 of adverse receiver's mount as prescribed by note 4.
7. Inside adverse mounts' J-box, check wiring from J24 (MT-1029) or J14 (MT-1898) pin D to J23 (MT-1029) or J11 and J13 (MT-1898) pin D for adverse opens. Afterwards see note 2.

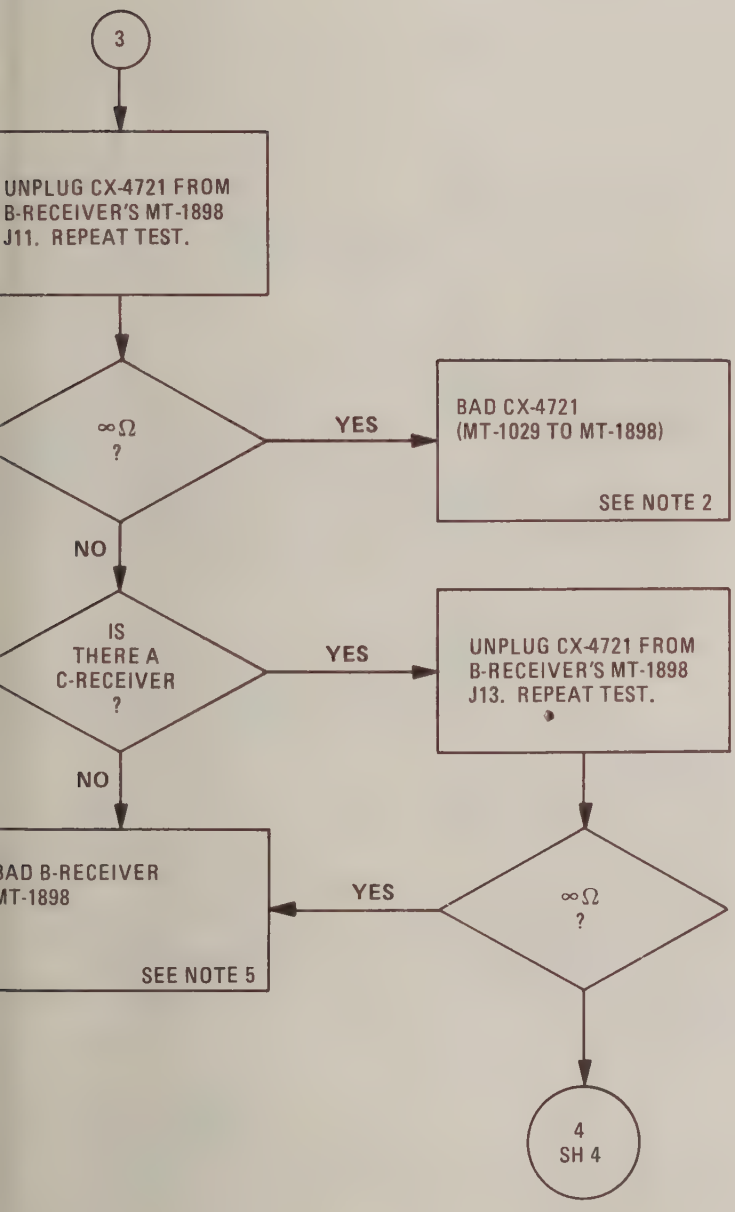
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24
Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 2 of 7)



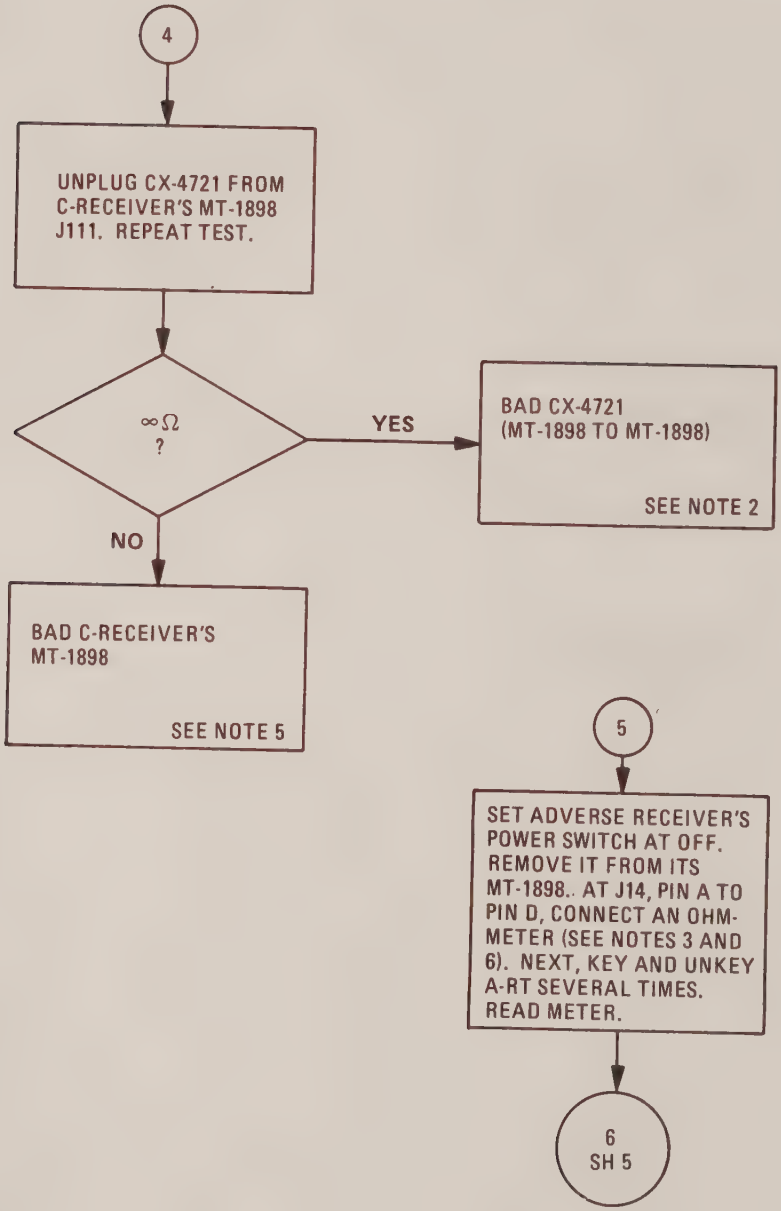
2. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24
Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 3 of 7)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

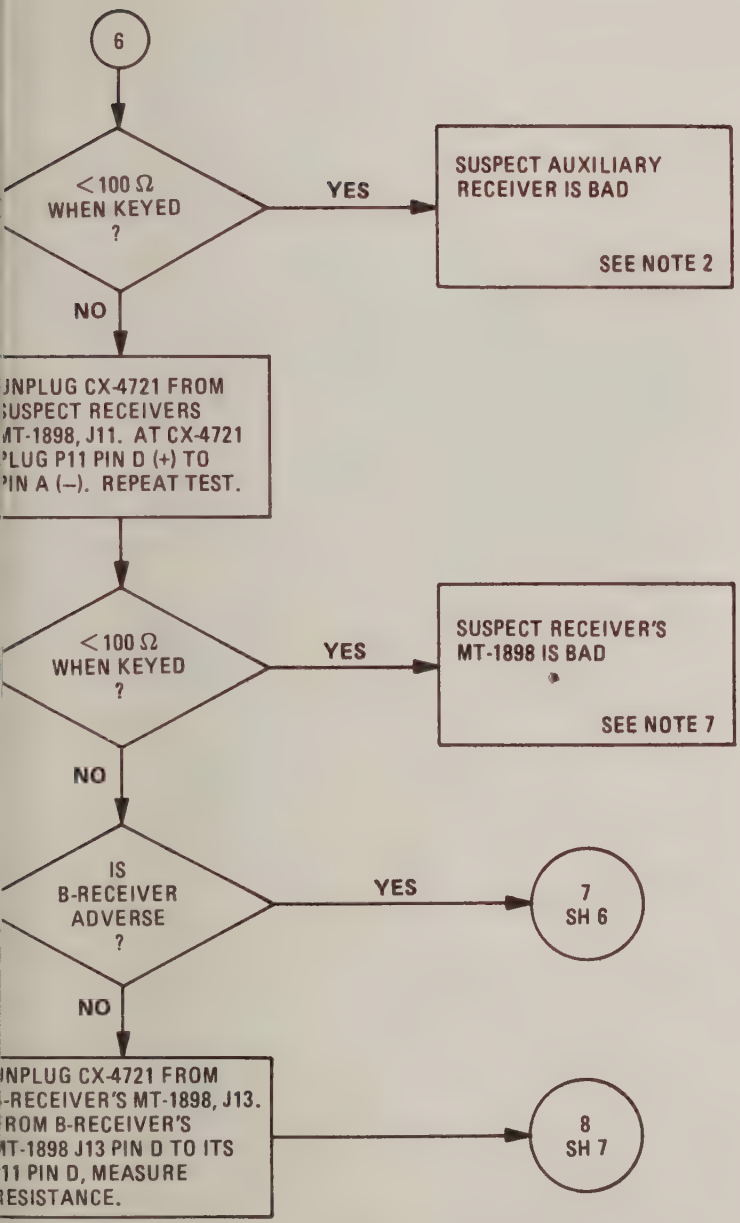
CHART 24
Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 4 of 7)


4
UNPLUG CX-4721 FROM C-RECEIVER'S MT-1898 J111. REPEAT TEST.
∞Ω ?
YES
BAD CX-4721 (MT-1898 TO MT-1898)
SEE NOTE 2
NO
BAD C-RECEIVER'S MT-1898
SEE NOTE 5
5
SET ADVERSE RECEIVER'S POWER SWITCH AT OFF. REMOVE IT FROM ITS MT-1898.. AT J14, PIN A TO PIN D, CONNECT AN OHM-METER (SEE NOTES 3 AND 6). NEXT, KEY AND UNKEY A-RT SEVERAL TIMES. READ METER.
6
SH 5

2. TROUBLESHOOTING FLOW CHARTS. (CONT)

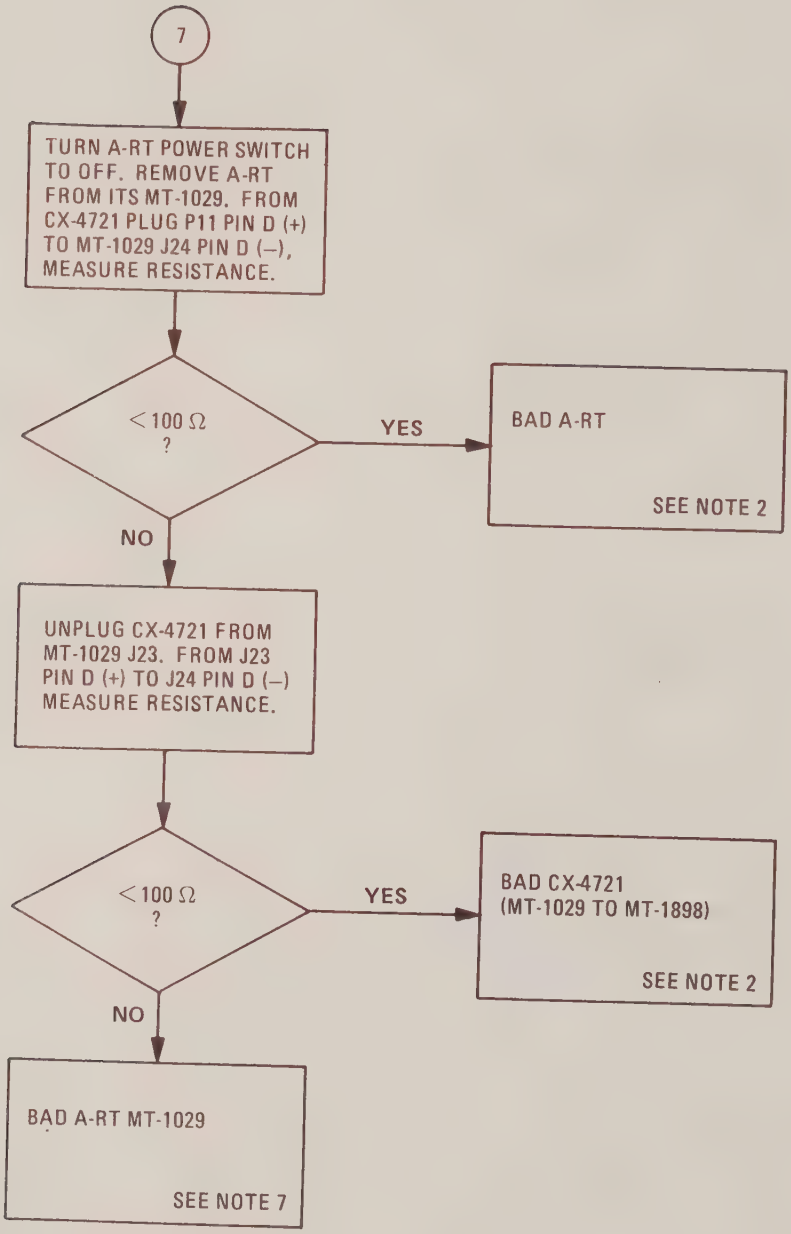
CHART 24

Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 5 of 7)


6
< 100 Ω WHEN KEYED ?
YES
SUSPECT AUXILIARY RECEIVER IS BAD
SEE NOTE 2
NO
UNPLUG CX-4721 FROM SUSPECT RECEIVERS MT-1898, J11. AT CX-4721 PLUG P11 PIN D (+) TO PIN A (–). REPEAT TEST.
< 100 Ω WHEN KEYED ?
YES
SUSPECT RECEIVER'S MT-1898 IS BAD
SEE NOTE 7
NO
IS B-RECEIVER ADVERSE ?
YES
7 SH 6
NO
UNPLUG CX-4721 FROM -RECEIVER'S MT-1898, J13. ROM B-RECEIVER'S T-1898 J13 PIN D TO ITS 11 PIN D, MEASURE ESISTANCE.
8 SH 7

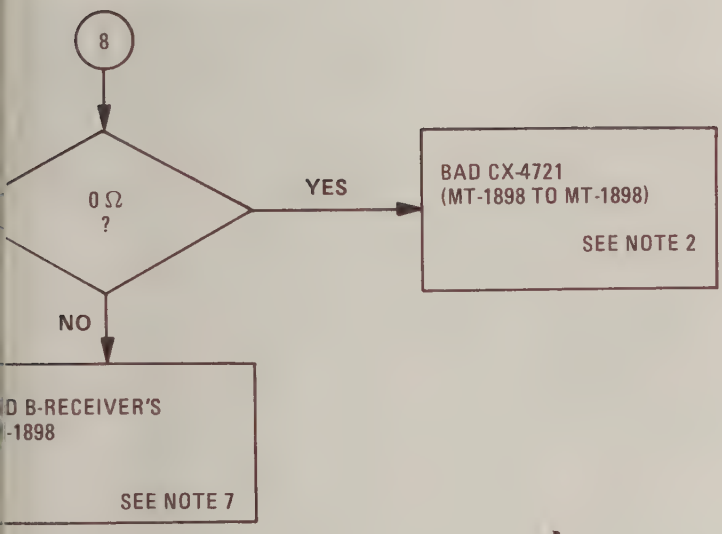
3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 24
Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 6 of 7)


7
TURN A-RT POWER SWITCH TO OFF. REMOVE A-RT FROM ITS MT-1029. FROM CX-4721 PLUG P11 PIN D (+) TO MT-1029 J24 PIN D (–), MEASURE RESISTANCE.
< 100 Ω ?
YES
BAD A-RT
SEE NOTE 2
NO
UNPLUG CX-4721 FROM MT-1029 J23. FROM J23 PIN D (+) TO J24 PIN D (–) MEASURE RESISTANCE.
< 100 Ω ?
YES
BAD CX-4721 (MT-1029 TO MT-1898)
SEE NOTE 2
NO
BAD A-RT MT-1029
SEE NOTE 7

TROUBLESHOOTING FLOW CHARTS. (CONT)

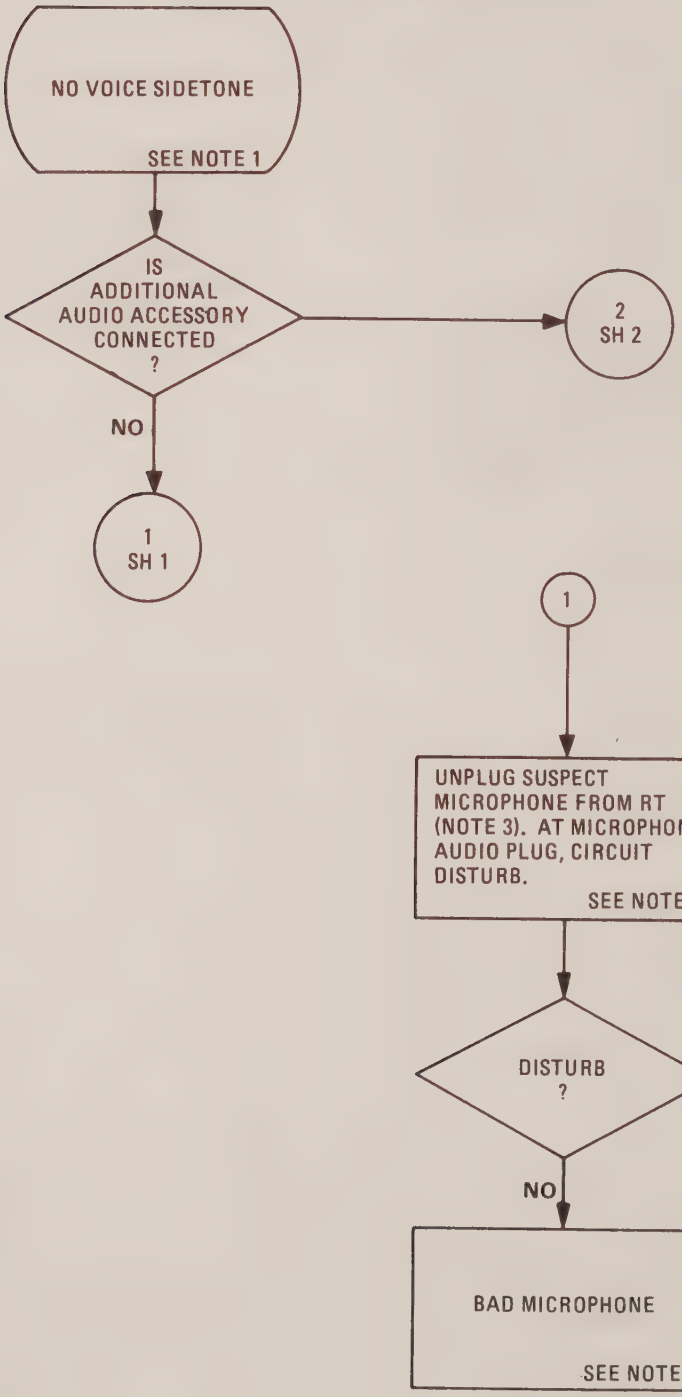
CHART 24
Troubleshoot A-RT's Auxiliary Receiver Speaker Muting Circuit (Sheet 7 of 7)



3-12. TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 25

Troubleshoot RT Voice Modulation Circuit (Sheet 1 of 2)

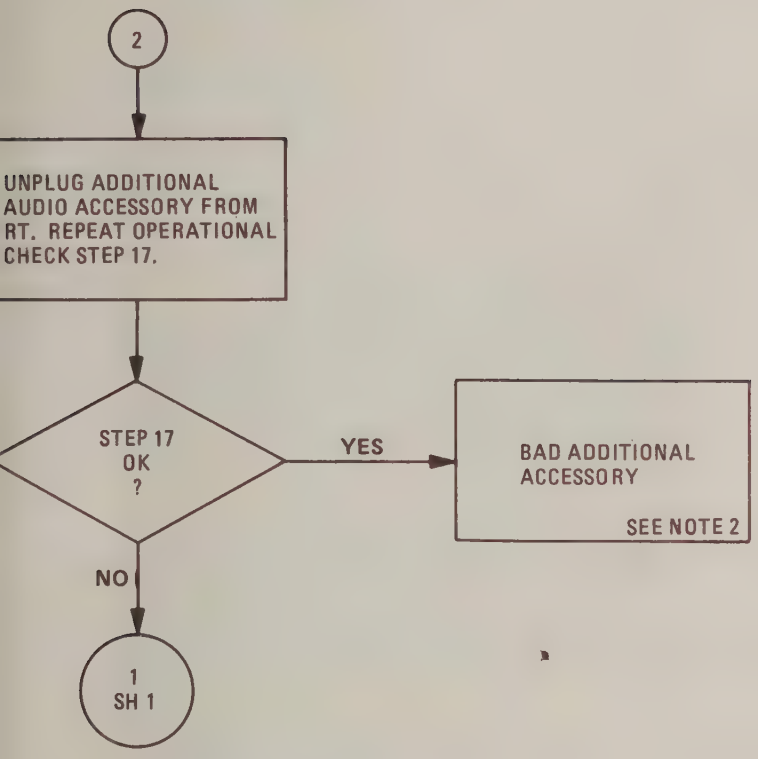


NOTES

1. This chart is used to troubleshoot either the A-RT or C-RT voice modulation circuit. Refer to FO-1 in back of this manual.
2. Fix or replace and return to operational chec at this time.
3. Make sure that audio plug and jack contacts clean and a serviceable O-ring is correctly installed in the plug.
4. To circuit disturb a microphone, connect ohmmeter leads to audio plug, pin D to pin A Next, press and release P-T-T switch while listening to the microphone element.

TROUBLESHOOTING FLOW CHARTS. (CONT)

CHART 25
Troubleshoot RT Voice Modulation Circuit (Sheet 2 of 2)



Section IV MAINTENANCE PROCEDURES

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ERVIEW

s section contains organizational maintenance procedures for the items of equipment that make up AN/VRC-12 series radio sets installed in wheeled vehicles.

Operational Check is used to see if the equipment is operating properly. Faults or malfunctions nd during the Operational Check indicate what troubleshooting should be done to locate a faulty m of equipment.

intenance procedures are provided to fix or replace items of the radio set at the organizational intenance level using authorized maintenance tools, equipment and repair parts. Refer to pendix B, Maintenance Allocation Chart.

3. OPERATIONAL CHECK.

NERAL

e Operational Check (Op Check) provides a step-by-step procedure for evaluating any one of the ht AN/VRC-12 series radio sets installed in military, wheeled vehicles. It specifies the procedure to used to check the operational state of the radio set's items of equipment. It includes tests for the 's, each RT antenna and auxiliary components (C-2299 and C-2742), the auxiliary receivers, the eivers' antenna, and the radio components' mounts. The Op Check is normally done with the uipment installed in the vehicle.

3-13. OPERATIONAL CHECK. (CONT)

As a minimum, the Op Check is done as part of the scheduled preventive maintenance checks and services (PMCS) for the vehicle's radio set. At the discretion of the C-E equipment maintenance supervisor, the Op Check could be done more often than the scheduled PMCS. After every repair of a item of equipment, the portion of the Op Check that applies to that item of equipment should be done again to insure that the malfunction has been corrected and that no other malfunctions exist.

NOTE

To insure valid evaluation results for the components of the radio set being checked, the Op Check must be followed exactly as written.

The Op Check first lists certain **preparatory actions** that, when done, establish a starting condition fo the **equipment performance checklist** that follows.

The **equipment performance checklist** portion is divided into **blocks** (A, B, C, etc.) and each block contains Op Check steps that, when done, test a specific circuit, or a set of closely related circuits, within a major component or within two or more components connected and working together.

Overall, and within each block, the Op Check **steps** are numerically sequenced (1, 2, 3, etc.) and these **step** numbers should be referenced when completing columns a and c of a reporting worksheet DA Form 2404.

Each step is **subtitled**, according to the specific functions being checked, and each column lists the **actions** to be done and the **expected normal indications**.

When **normal** indications are observed for a specific **step**, proceed to the next **step** or follow the How t Proceed instructions below that step. When **normal** indications are observed for all steps within a block, follow the How to Proceed instructions at the end of that block.

When **abnormal** indications are observed for a specific step, that step will either state the faulty item o equipment or reference a **troubleshooting chart** by number. These charts are included in section III of this chapter.

Each **troubleshooting chart** provides a step-by-step troubleshooting method (including t/s techniques and a procedure) that when followed will identify the faulty item of equipment.

Throughout the Op Check are cautions, warnings, and setups that must be observed or done for equipment and personal safety, as well as an accurate evaluation of all of the radio set's functions.

13. OPERATIONAL CHECK. (CONT)

ased on which test set is available (AN/PRM-34 or AN/URM-182), two versions of the Op Check ocedure are provided.

1. When Test Set AN/PRM-34 is available, use the procedure of paragraph 3-14 below.
2. When Test Set AN/URM-182 is available, use the procedure of paragraph 3-15, starting on page 3-115.

14. PROCEDURE USING TEST SET AN/PRM-34.

e AN/PRM-34 test set must be used to complete this procedure. Cabling instructions and test set witch settings for the AN/PRM-34 will be given as they apply throughout the procedure.

ITIAL ADJUSTMENTS

WARNING

To safeguard against electrical shock and possible damage to equipment, remove or tape **all** personal exposed metal objects (e.g., watches, rings and medallions).

o prevent personnel injury and damage to the equipment, turn all communication component POWER witches to OFF. Depending on the type of vehicle and its actual radio set, turn to OFF the following:

NOTE

Refer to illustration of typical installation on page 2-6.

1. Switch box assembly (if included, in cab compartment)
2. RT unit (RT-524/RT-246) POWER switches
3. R-442 POWER switches
4. C-2742 PWR SW (power switch) switches.

CAUTION

Do not start vehicle engine with radio set turned on. Make certain that **all** components that have POWER switches are turned to OFF. Starting a vehicle engine with the radio components turned to ON can cause serious damage to the components.

NSTALLATION CHECKS

efer to chapter 1, section II of this manual or an appropriate 2300 series TM to insure that all items of quipment of the radio set are properly installed and that all cables are properly routed and onnected.

NOTE

TM 11-5820-401-10-1-HR contains example hand receipts that, based on the actual vehicle and radio set configuration, can be used to inventory items of equipment and determine National stock numbers (NSN's).

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

PRESET CONTROLS

To establish a logical starting point for the evaluation procedure, the controls of the components of radio set must be preset according to the following preparatory actions.

RECEIVER-TRANSMITTERS, RT-524/VRC AND RT-246/VRC

Set the controls of **all** Receiver-Transmitters as follows:

1. Turn BAND switch to 30-52 (A) .
2. Turn LIGHT switch to ON.
3. Turn SPEAKER switch to ON (RT-524 only).
4. Tune MC-TUNE-KC controls for 50.00 MHz.
5. Turn SQUELCH switch to OLD OFF.
6. Turn VOLUME control fully counterclockwise to no volume.

NOTE

Objectionable interference may result when RT is tuned to 33.90, 45.20, 56.50, and 67.80 MHz. Avoid tuning RT to these frequencies.

RECEIVERS R-442/VRC (WHEN INCLUDED)

Set the controls of **all** auxiliary receivers as follows:

1. Turn BAND switch to 30-52 (A) .
2. Turn LIGHT switch to ON.
3. Tune MC-TUNE-KC controls for 50.00 MHz.
4. Turn VOLUME control fully counterclockwise to no volume.
5. Turn SQUELCH switch to OLD OFF.

RETRANS BOX, C-2299/VRC (WHEN INCLUDED)

Set the controls of **all** RETRANS boxes as follows:

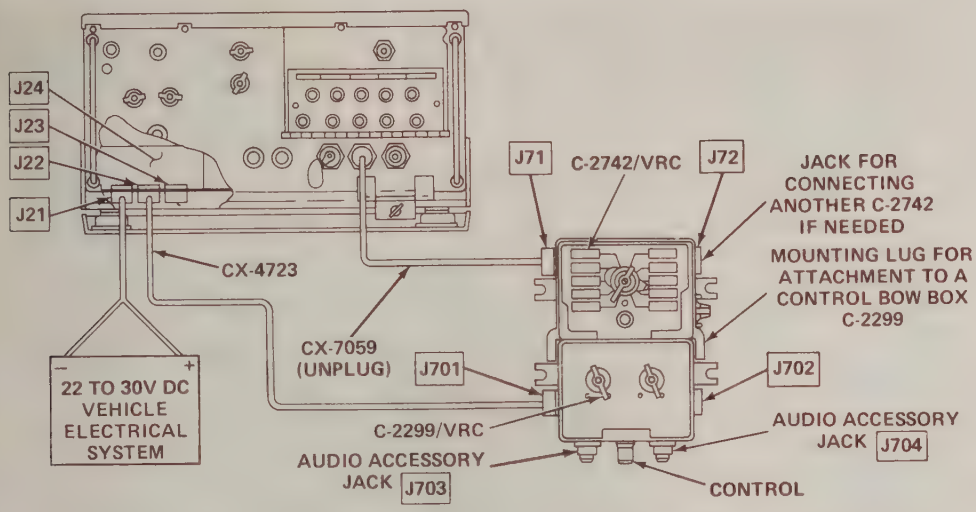
1. Turn RAD TRANS switch to 1.
2. Turn RETRANS switch to OFF.
3. Turn VOLUME control fully clockwise to maximum volume.

NOTE

The C-2299 retrans box, though used primarily for a retrans function of the AN/VRC-49 and -45, also can be used as a convenience box for the connection of audio accessories for the six AN/VRC-12 configurations.

4. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

2742/VRC REMOTE BOX AND C-2299/VRC RETRANS BOX



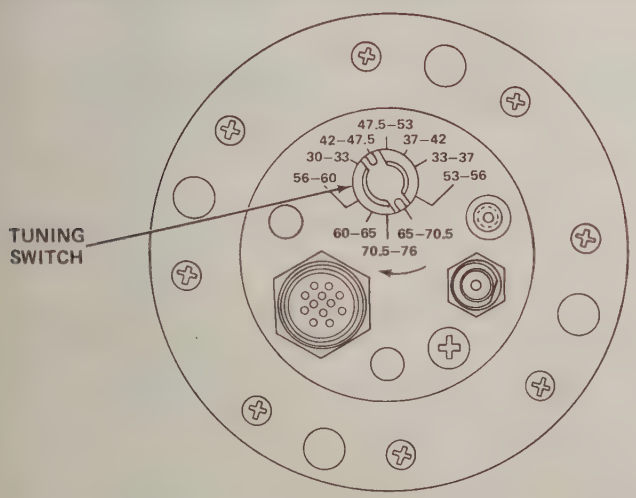
he C-2742/VRC remote box is sometimes mounted on top of the C-2299/VRC retrans box. The mote box enables the operator to control the RT-246 dc input power, its transmit rf power level, and lect preset channels of the RT-246/VRC from a remote (cab compartment) location.

this case, the C-2299/VRC provides a remote connection for the RT-246 audio accessories.

EMOTE BOX, C-2742/VRC (WHEN INCLUDED)

nplug **all** CX-7059 cables from their RT-246 REMOTE jacks.

T ANTENNA MATCHING UNITS MX-6707/VRC AND MX-2799/VRC



FREQUENCY RANGES

30 – 33	53 – 56
33 – 37	56 – 60
37 – 42	60 – 65
42 – 47.5	65 – 70.5
47.5 – 53	70.5 – 76

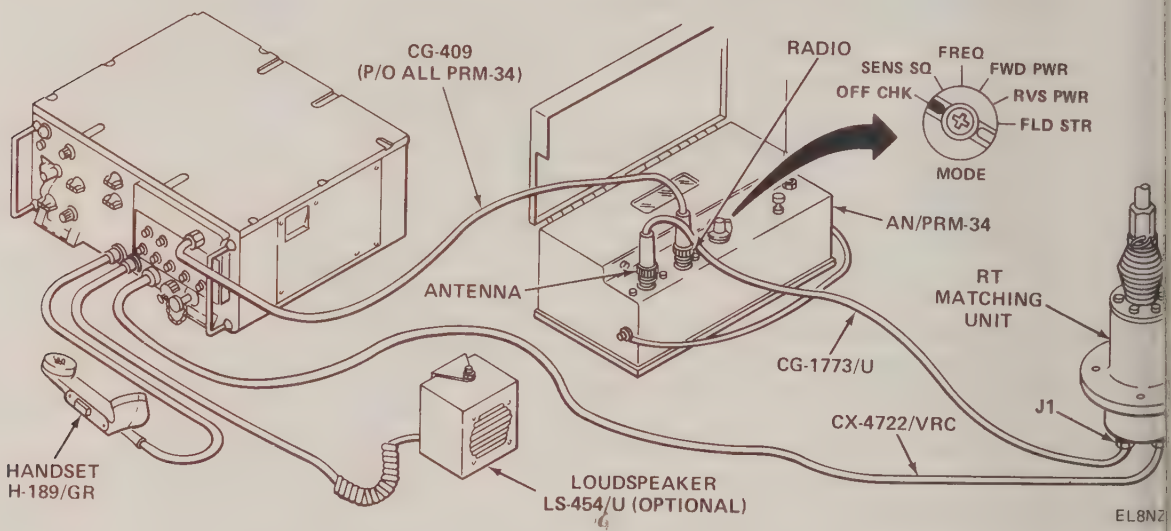
f possible, on MX-6707, manually turn the frequency range tuning switch to 47.5-53 MHz. (This etting corresponds with the RT frequency setting of 50 MHz.) The MX-2799 requires no presetting.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

AN/PRM-34 TEST SET CABLING

The AN/PRM-34 is a self-contained test set that is used to check specific functions of the radio set components (RT-524, RT-246 and R-442) and their antennas. For all radio sets being checked, first connect the test set to the A-RT and then, **as directed later**, connect it to the other radio components as illustrated below.

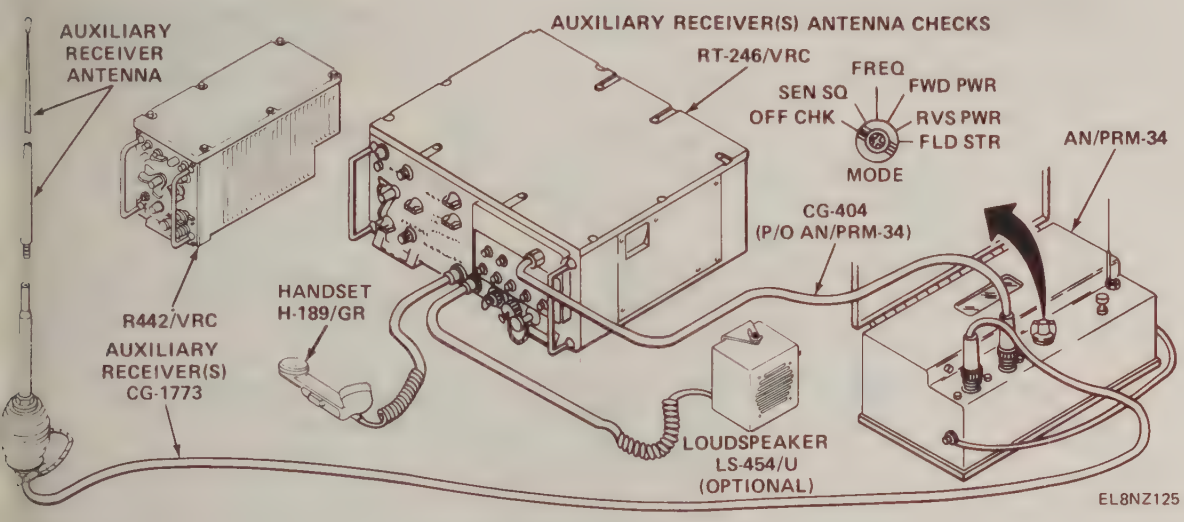
RT-524/VRC OR RT-246/VRC (RT AND RT's ANTENNA CHECKS)



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-409	AN/PRM-34	RADIO		A-RT	ANT	
CG-1773/U (RT's)	AN/PRM-34	ANT		Matching Unit	J1	
CX-4722/VRC	A-RT	ANT CONT	P1	Matching Unit	J2	P

14. **PROCEDURE USING TEST SET AN/PRM-34.** (CONT)

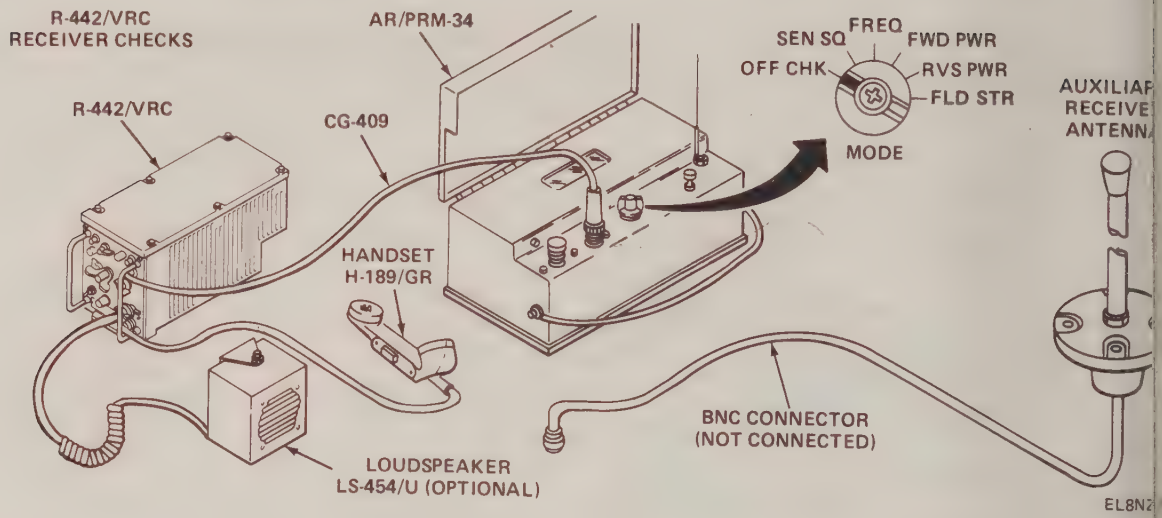
JXILIARY RECEIVER(S) ANTENNA CHECK



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CABLE PLUG
CG-1733 (R-442's)	AN/PRM-34	ANT		R-442 Antenna Base or AB-558		
CG-409	AN/PRM-34	RADIO		A-RT	ANT	

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

R-442/VRC, RECEIVER CHECKS



FROM				TO		
CABLE	ASSEMBLY	JACK	CABLE PLUG	ASSEMBLY	JACK	CAB PL
CG-409	Aux Rec	ANT		AN/PRM-34	RADIO	

VERIFY OPERATION OF TEST SET AN/PRM-34

The AN/PRM-34 has a self-check feature that is used to verify its operation. Before using the AN/PRM-34 to test radio components, self-check it as follows.

CAUTION

To prevent possible damage to the AN/PRM-34, insure that the radio set is off before self-checking the test set. (Actions of Initial Adjustments must be done first.)

1. Turn AN/PRM-34 MODE switch to OFF/CHECK.
2. Press down AN/PRM-34 PUSH TO TEST switch. The MHz lamp should light and display should be 01.000 or 1-000. Any other indications indicate a faulty AN/PRM-34 (possibly a bad battery).
3. Release PUSH TO TEST switch before going on.

14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

. RT INPUT POWER, INITIAL RECEIVE, AND INITIAL MATCHING UNIT (MX) CONTROL CHECKS.

o these checks for all RT's. When radio set is an AN/VRC -45 or -49, first do these checks for the -RT and then **as directed later** do them again for the C-RT.

tep 1 INPUT POWER

NOTE

For this check, if matching unit was **not** initially preset, matching unit switching sound may be heard.

Turn RT POWER switch to LOW.	RT dial lamp should light. If lamp fails to light, refer to troubleshooting chart 1. If RT keys (blower runs and FWD PWR check indicates rf transmit power), refer to troubleshooting chart 6.

Direction: Allow 2-minute warmup.

tep 2 AUDIO OUTPUT

Setup:
1. Unplug Antenna Cable CG-1773 from AN/PRM-34 ANT jack.

CAUTION

Do not key an RT when its Antenna Cable (CG-1773) is unplugged.

2. Appropriate audio accessories should be connected to RT being checked.

Turn RT VOLUME control fully clockwise (cw), then counterclockwise (ccw) to midpoint.	In earphone and speaker: rushing noise loudness should increase. At full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 2. If rushing noise is not heard in speaker, refer to troubleshooting chart 3.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 3	INITIAL MATCHING UNIT (MX) CONTROL	
	Turn RT BAND switch to other setting; then **return** to original setting.	Switching sound should be heard at matching unit. (For the MX-6707 the range setting should agree with the RT MC setting. If matching unit fails to switch, or switching won't stop, refer to trouble-shooting chart 4.
HOW TO PROCEED. Go to block B.		

B. RT RECEIVER AND COMPLETE MX CONTROL CHECKS

Do these checks for all RT's. When radio set is an AN/VRC -45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 4	SQUELCH CONTROL AND CALL LAMP	
	Rotate RT SQUELCH switch through all four positions.	a. **OFF positions:** A loud rushing noise should be heard. b. **ON positions:** The rushing noise should be quieted (eliminated). c. **CALL lamp:** Should remain OFF for all positions. If indications are not correct, RT being checked is bad.
Step 5	RECEIVER SENSITIVITY (RECEPTION) AND COMPLETE MX CONTROL	
	Setup: Turn AN/PRM-34 MODE switch to SEN SQ. Direction: For the RT being checked, starting with 50.00 MHz, do the substeps (a thru d) for each frequency listed below. Frequency setting: **1.** 50.00, **2.** 45.00, **3.** 40.00, **4.** 35.00, **5.** 30.00 (change BAND switch setting) **6.** 55.00, **7.** 60.00, **8.** 65.00, **9.** 70.00 and **10.** 75.00.	

4. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

ep 5 ont)	a. As RT's frequency is changed, listen for matching unit switching.	a. MX switching sound should be heard when RT MC setting is changed by more than 3 MHz. If for any setting, MX fails to switch or won't stop switching, refer to troubleshooting chart 4.
	b. Turn RT SQUELCH switch to OLD OFF; then press down and release AN/PRM -34 PUSH TO TEST several times.	b. **When AN/PRM-34 PUSH TO TEST is pressed**, rushing noise should be quieted and a tone should be heard at audio accessories. **When AN/PRM-34 PUSH TO TEST is released,** rushing noise should be heard. If indications are incorrect, RT being checked is bad.
	c. Turn RT SQUELCH switch to NEW OFF; then press down and release AN/PRM -34 PUSH TO TEST several times.	c. Indication should be the same as substep b.
	d. One at a time, tune RT (in 5-MHz steps) to other nine frequency settings listed. At each setting, repeat substeps a, b and c.	d. For each frequency setting, indications should be the same as in substeps a and b.

tep 6 SQUELCH SENSITIVITY

Setup:
1. Tune RT being checked to 75.00 MHz.
2. AN/PRM-34 MODE switch should be at SENS SQ.

a. Turn RT SQUELCH switch to NEW ON; then press down and release AN/PRM -34 PUSH TO TEST several times.	a. **When AN/PRM-34 PUSH TO TEST is pressed**, CALL lamp should light and a tone should be heard. **When AN/PRM-34 PUSH TO TEST is released,** CALL lamp should go off and a **very short** burst of rushing noise should be heard. If indications are incorrect, RT being checked is bad.
b. Turn RT SQUELCH switch to OLD ON; then press down again and release the AN/PRM-34 PUSH TO TEST several times.	b. Indication should be the same as substep a.

HOW TO PROCEED. Go to block C.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

C. RT KEYING AND MUTING CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 7	KEYING	
	Setup for RT being checked: 1. Turn SQUELCH switch to OLD OFF. 2. Replug Antenna Cable CG-1773 to AN/PRM-34 ANT jack. 3. POWER switch should be at LOW. **CAUTION** For this check, **do not** key RT when antenna is disconnected. When keyed, if blower does not run, **do not** keep RT keyed for more than 3 seconds.	
	Key RT. (Press/release the PTT switch several times.) (Unkey before going on.)	**When PTT is pressed,** RT relays should click, blower should run; rushing noise should drastically reduce. If RT fails to key, refer to trouble-shooting chart 5. **When PTT is released,** relays should again click; rushing noise should return, blower might stop running. If RT remains keyed, refer to trouble-shooting chart 6.
Step 8	MUTING	
	With RT speaker on (VOLUME at mid-point) again key RT. (Unkey RT before going on.)	With mike at about 10 inches from speaker there should be **no** audio feedback (squeal). If feedback occurs, RT being checked is bad.
HOW TO PROCEED. When RT being checked is an: RT-246, go to block D. RT-524, go to block F.		

14. **PROCEDURE USING TEST SET AN/PRM-34.** (CONT)

RT-246 SERVO TUNE (AUTOMATIC TUNING) CHECK

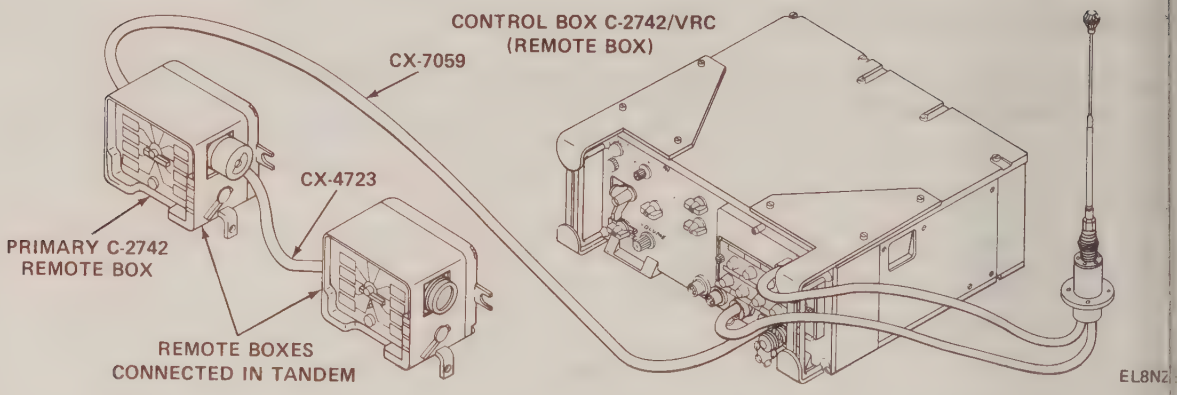
o this check for all RT-246's. When radio set is an AN/VRC-45, first do this check for the A-RT and en **as directed later** do them again for the C-RT.

ep 9 AUTOMATIC TUNE	
Setup for RT being checked: Turn BAND switch to AUTO. **NOTE** Instructions for presetting RT-246 pushbuttons are on closed side of the pushbutton hinged cover. Refer to sample DA Form 2404 of block F (page 3-102) for ten frequencies to be preset.	
a. Using the ten frequencies given, preset frequency 1 on pushbutton ① , frequency 2 on pushbutton ② , etc., until all ten are preset. b. In descending order, press each pushbutton, **but allow each tuning cycle to complete before pressing another pushbutton.**	a. The preset frequency should appear in RT dial-frequency window as presetting is accomplished. MX switching sound should be heard. b. RT MC-TUNE-KC controls and BAND switch (as appropriate) should change to preset frequency. MX switching sound should be heard. If RT fails to tune, RT being checked is bad. If for any preset frequency, MX fails to switch or won't stop switching, refer to troubleshooting chart 4.
HOW TO PROCEED. When RT-246 being checked has: C-2742's, go to block E. **No** C-2742's, go to block F.	

E. RT-246/REMOTE BOX, C-2742 INTERFACE CHECKS

Do these checks for all RT-246's that have C-2742's. When radio set is an AN/VRC-45, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)



When two C-2742 remote boxes are in tandem, first check the box directly connected to the RT (primary C-2742).

Step 10	R-246 REMOTE INPUT POWER CONTROL	
	Setup: For RT-246 being checked: 1. Press in RT-246 pushbutton ① (allow tuning cycle to complete). 2. Turn RT POWER switch to OFF. 3. Replug CX-7059 cable to appropriate RT REMOTE jack. 4. Unlock **all** C-2742 knob stops. 5. Turn **all** C-2742 CHAN SEL switches to channel 1 (lower left write-in space). 6. **All** C-2742 PWR SW (power switches) should be at OFF. 7. If two C-2742's are in tandem, unplug CX-4723 from primary C-2742 (J72).	
	a. Turn RT POWER switch to REMOTE.	a. RT should remain off. If RT comes on, refer to troubleshooting chart 7.
	b. Turn C-2742 PWR SW to LO; then press back and release C-2742 SW (toggle switch).	b. RT dial lamp and C-2742 control lamp should light. (C-2742 lamp might come on without pressing SW.) If lamp fails to light, refer to troubleshooting chart 8.
Step 11	R-246 HIGH/LOW TRANSMIT RF POWER CONTROL	
	Turn C-2742 PWR SW to HI; then to LO several times.	RT's high/low power relay should click each time C-2742 PWR SW is changed. If relay fails to click, refer to trouble-shooting chart 9.

14. **PROCEDURE USING TEST SET AN/PRM-34.** (CONT)

ep 12	RT-246 REMOTE FREQUENCY SELECTION	
	In turn, **but allowing each tuning cycle to complete,** turn C-2742 CHAN SEL switch to each of its ten positions.	RT MC-TUNE-KC controls and BAND switch (as appropriate) should change according to the ten RT-246 preset frequencies. MX switching should occur. If RT tunes to a wrong frequency or won't stop tuning, refer to troubleshooting chart 10. If RT fails to change frequency, refer to troubleshooting chart 11.
	Direction: When C-2742's are in tandem, replug CX-4723 to primary C-2742 (J72). Repeat steps 10b, 11 and 12 (above) for the second C-2742. (The primary C-2742 PWR SW **must** remain at LO or HI.) Upon completion go to step 13 below.	
tep 13	RT-246 REMOTE INPUT POWER CONTROL SHUTDOWN	
	a. Turn primary C-2742's PWR SW to OFF.	a. RT should stop operating. If RT continues to operate, refer to troubleshooting chart 7.
	b. Turn RT POWER switch to LOW.	b. RT dial lamp should light. If lamp fails to light, RT being checked is bad.
	HOW TO PROCEED. Go to block F.	

F. RT TRANSMITTER RF POWER LEVELS, ANTENNA, FREQUENCY ACCURACY CHECKS

Do this check for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

CAUTION

Insure that all antenna components and cables are connected to the appropriate RT.

NOTE

During the checks of block F, specific RT data must be recorded. This data is in addition to other maintenance actions recorded on the reporting DA Form 2404. Refer to the following illustration for format of this additional worksheet.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

ADDITIONAL DA FORM 2404

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET
For use of this form see TM 38 750 the proponent agency is the Office of the Deputy Chief of Staff for Logistics.

1 ORGANIZATION (RT Serial no.)		2 NOMENCLATURE AND MODEL		
3 REGISTRATION/SERIAL NSN	4a MILES	b (RT Model no. (e.g. RT-524, RT-246))	5 DATE	6 TYPE INSPECTION
7				
TM NUMBER	TM DATE	TM NUMBER		

COLUMN a — Enter TM item number.

COLUMN b — Enter the applicable condition status symbol.

COLUMN c — Enter deficiencies and shortcomings.

COLUMN d — Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e — Individual ascertaining completed corrective action initial in this column.

STATUS SYMBOLS

"X" — Indicates a deficiency in the equipment that places it in an inoperable status.

CIRCLED "X" — Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.

HORIZONTAL DASH "(-)" — Indicates that a required inspection, component replacement, maintenance operation check or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.

DIAGONAL "(/)" — Indicates a material defect other than a deficiency which must be corrected to increase deficiency or to make the item completely serviceable.

LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL Indicates that a completely satisfactory condition exists.

FOR AIRCRAFT Status symbols will be recorded in red.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE (Person(s) performing inspection)	8b. TIME	9a. SIGNATURE (Maintenance Supervisor)	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO a	STATUS b	DEFICIENCIES AND SHORTCOMINGS c	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e
1.	75.00	a.____ b.____ FWD RVS c.____MHz	6. 31.45 a.____ b.____ FWD RVS c.____MHz	
2.	67.05	a.____ b.____ FWD RVS c.____MHz	7. 35.60 a.____ b.____ FWD RVS c.____MHz	
3.	62.20	a.____ b.____ FWD RVS c.____MHz	8. 39.65 a.____ b.____ FWD RVS c.____MHz	
4.	58.25	a.____ b.____ FWD RVS c.____MHz	9. 44.80 a.____ b.____ FWD RVS c.____MHz	
5.	54.40	a.____ b.____ FWD RVS c.____MHz	10. 50.85 a.____ b.____ FWD RVS c.____MHz	

DA FORM 1 APR 79 2404 Replaces edition of 1 Jan 64 which will be used

EL8NZ205

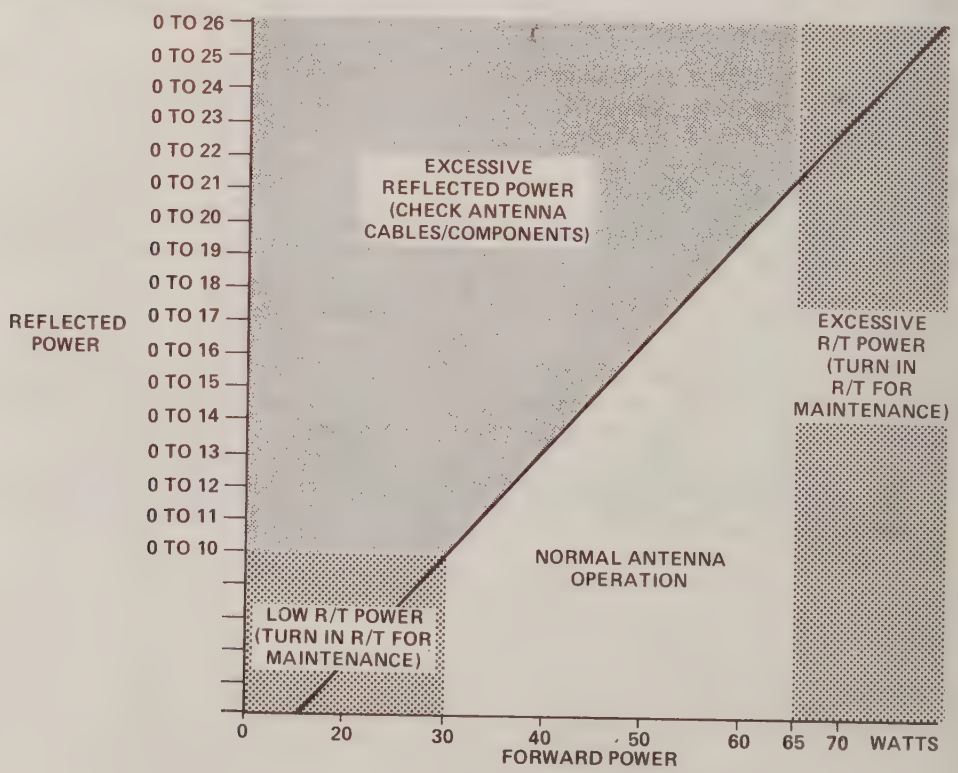
4. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

ep 14	HIGH-LEVEL RF TRANSMIT POWER, AND FREQUENCY ACCURACY	
	Setup: 1. Prepare a worksheet (DA Form 2404). See illustration on previous page. 2. Turn POWER switch of RT being checked to HIGH. **NOTE** To obtain a valid check, the vehicle should be in a clear area of about a 25-foot radius of the RT's antenna. Direction: For RT being checked, starting with 75.00 MHz, do the substeps (a thru e) for each frequency listed on worksheet. **CAUTION** Do not change RT tuning when RT is keyed.	
	a. As RT frequency is changed, listen for matching unit switching.	a. MX switching sound should be heard when RT MC setting is changed. If for any setting, MX fails to switch or won't stop switching, refer to troubleshooting chart 4.
	b. Turn AN/PRM-34 MODE switch to FWD PWR. Key RT; then press down AN/PRM-34 PUSH TO TEST. (On worksheet, next to the appropriate listed frequency, record the AN/PRM-34 reading at substep a.) Release PUSH TO TEST.	b. AN/PRM-34 should indicate (display) between 30 and 65 watts. EXAMPLE: 75.00 MHz 40 / FWD Regardless of reading, complete substeps c, d and e below before referring to troubleshooting conclusions at end of this step.
	c. Turn AN/PRM-34 MODE switch to RVS PWR. Key RT; then press AN/PRM-34 PUSH TO TEST. (On worksheet, next to appropriate listed frequency, record the AN/PRM-34 reading at substep b.) Release PUSH TO TEST and unkey RT.	c. AN/PRM-34 should indicate (display) no more than one-third of FWD PWR reading. EXAMPLE: 75:00 MHz a. 40 / FWD b.13.3 / RVS

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 14 (Cont)	d. Turn AN/PRM-34 MODE switch to FREQ. Key RT; allow 3-second warm-up, then press down AN/PRM-34 PUSH TO TEST. (On worksheet next to appropriate listed frequency, record the AN/PRM-34 reading at substep c.) Release PUSH TO TEST and unkey RT. e. One at a time, tune RT being checked to other nine frequency settings listed on worksheet. At each frequency, repeat substeps a through d above and complete worksheet as directed.	d. AN/PRM-34 should indicate (display) the RT dial frequency setting plus or minus (±) 4 kHz. EXAMPLE: 35.60 MHz not less than 35.596 not more than 35.604 If result is more than 4 kHz off dial frequency, RT being checked is bad. e. For each frequency setting, indications should be same as substeps a through Troubleshooting conclusions: If for any frequency setting: RVS PWR is more than one-third of FWD PW reading (regardless of FWD PWR reading), refer to troubleshooting chart 12. RVS PWR is less than one third of FWD PW (okay) **but** FWD PWR is less than 30 watts or more than 65 watts, RT being checked is bad.

TRANSMITTED FORWARD-VS-REFLECTED POWER CHART (RT POWER SWITCH AT HIGH)



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4. **PROCEDURE USING TEST SET AN/PRM-34.** (CONT)

ıp 15	LOW-LEVEL RF TRANSMIT POWER	
	Setup: 1. Turn POWER switch of RT being checked to LOW. 2. Turn AN/PRM-34 MODE switch to FWD PWR.	
	a. Key RT; then press down AN/PRM-34 PUSH TO TEST. (Unkey RT before going on.)	a. AN/PRM-34 should indicate (display) 0.5 to 10 watts. If indication is incorrect, RT being checked is bad.
	b. Change RT BAND switch to other position. Key RT; then press down AN/PRM-34 PUSH TO TEST. (Unkey RT before going on.)	b. Indication should be the same as substep a.
ɔW TO PROCEED. Go to block G.		

. RT MODULATION AND SIDETONE CHECKS

o these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the -RT and then, **as directed later,** do them again for the C-RT.

tep 16	150-Hz SIDETONE AND MODULATION	
	Setup: POWER switch of RT being checked should be at LOW.	
	Key RT; while keyed turn RT SQUELCH switch through all four positions. Listen to earphone. (Unkey RT before going on.)	150-Hz sidetone should be heard in earphone for all SQUELCH positions **except** OLD ON. (Adjust RT VOLUME as required.) If sidetone is not heard, RT being checked is bad.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 17 VOICE SIDETONE AND MODULATION		
	Key RT and initiate a radio check.	Voice sidetone should be heard in earphone. (Adjust RT VOLUME as required.) If sidetone is **not** heard, RT being checked is bad.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-12, -43, -44, -46, -47 or -48 **with** C-2299 or AN/VRC -45 or -49 whose C-RT **has** been checked, go to block H.
AN/VRC-12, -44, -47 or -48 **without** C-2299 or AN/VRC-45 or -49 whose C-RT **has not** been checked, go to block I.
AN/VRC-43 or -46 **without** C-2299, go to block L.

H. RELAY BOX, C-2299 CHECKS

Do these checks for all radio sets that have C-2299's.

Step 18 A-RT AUDIO OUTPUT		
	Setup: 1. C-2299 should be preset according to preset instructions on page 3-90. 2. Turn **all** RT speakers to OFF. 3. Turn **all** RT SQUELCH switches to NEW ON. 4. **All** RT POWER switches should be at LOW. 5. Connect A-RT audio accessories to C-2299 audio jacks. **NOTE** IAW means "In Accordance With". This term applies throughout these checks.	
	a. Turn A-RT SQUELCH switch to NEW OFF; then vary A-RT VOLUME control. Return A-RT VOLUME control to midpoint.	a. As heard in C-2299 earphone, loudness of rushing noise should vary IAW VOLUME setting. If rushing noise is not heard, refer to troubleshooting chart 13.
	b. Vary C-2299 VOLUME control. Return to fully cw position (full volume).	b. Same as substep a.

4. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

ep 19	A-RT KEYING	
	Key A-RT. (Press/release PTT switch of audio accessory connected to C-2299 several times.) (Unkey RT before going on.)	**When PTT is pressed,** A-RT relays should click, A-RT blower should run; rushing noise should be drastically reduced. If A-RT fails to key, refer to trouble-shooting chart 14. **When PTT is released,** A-RT relays should again click, rushing noise should return; A-RT blower might stop running. If A-RT remains keyed, refer to trouble-shooting chart 6.
ep 20	A-RT MODULATION	
	Key A-RT; initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in earphone connected to C-2299. If sidetone is not heard, refer to trouble-shooting chart 15.

OW TO PROCEED. When radio set being checked is an:
N/VRC-12, -44, -47 or -48, go to block I.
N/VRC-45 or -49 (both RT's checked), complete steps 21 through 24.
N/VRC-43 or -46, go to block L.

tep 21	C-RT AUDIO OUTPUT	
	Setup: 1. Turn A-RT SQUELCH switch to NEW ON. 2. Turn C-2299 RAD TRANS switch to 2.	
	a. Turn C-RT SQUELCH switch to NEW OFF; then vary C-RT VOLUME control. Return C-RT VOLUME control to midpoint.	a. As heard in C-2299 earphone, loudness of rushing noise should vary IAW VOLUME setting. If rushing noise is not heard, refer to troubleshooting chart 13.
	b. Vary C-2299 VOLUME control. Return to fully cw position (full volume).	b. Same as substep a.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 22 C-RT KEYING

Key C-RT. (Press/release PTT switch of audio accessory connected to C-2299 several times.) (Unkey RT before going on.)	**When PTT is pressed,** C-RT relays should click, C-RT blower should run; rushing noise should be drastically reduced. If C-RT fails to key, refer to trouble-shooting chart 14. **When PTT is released,** C-RT relays should again click, rushing noise should return; C-RT blower might stop running. If C-RT remains keyed, refer to trouble-shooting chart 6.

Step 23 C-RT MODULATION

Key C-RT; initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in ear-phone connected to C-2299. If sidetone is not heard, refer to troubleshooting chart 15.

Step 24 RELAY (RETRANSMISSION)

Setup:
1. Turn **both** RT SQUELCH switches to NEW ON.
2. **Both** RT POWER switches should be at LOW.
3. Tune A-RT to 52.00 MHz.
4. Tune C-RT to 75.00 MHz.
5. AN/PRM-34 should be connected in C-RT's rf antenna circuit.

CAUTION

Insure that RT antennas are properly cabled to their appropriate RT's.

6. Turn AN/PRM-34 MODE switch to SENS SQ.

A-RT TRANSMITTER/C-RT RECEIVER

a. Turn C-2299 RETRANS switch to ON.	a. **Both** RT's should remain unchanged. If indications are incorrect, refer to troubleshooting chart 16.

4. **PROCEDURE USING TEST SET AN/PRM-34.** (CONT)

ep 24 cont)	b. Turn C-2299 RAD TRANS switch to 1; then press down AN/PRM-34 PUSH TO TEST.	b. C-RT CALL lamp should light. A-RT should key, and a 900-Hz tone (A-RT modulation) should be heard in earphone connected to C-2299. If RT fails to key, refer to troubleshooting chart 17. If 900-Hz tone is not heard in earphone (A-RT modulation), refer to troubleshooting chart 18.
	A-RT RECEIVER/C-RT TRANSMITTER	
	Directions: 1. Turn POWER to **both** RT's to OFF. (Turn only A-RT POWER switch to OFF when C-RT power is remoted.) 2. Move AN/PRM-34 from C-RT rf antenna circuit to A-RT rf antenna circuit (see illustration on page 3-92). **CAUTION** Insure that RT antennas are properly cabled to their appropriate RT's. 3. AN/PRM-34 MODE switch should be at SENS SQ. 4. Tune A-RT to 75.00 MHz. 5. Tune C-RT to 52.00 MHz. 6. **Both** RT's POWER switches should be at low.	
	c. Turn C-2299 RAD TRANS switch to 2; then press down AN/PRM-34 PUSH TO TEST.	c. A-RT CALL lamp should light. C-RT should key, and a 900-Hz tone (C-RT modulation) should be heard in the earphone connected to the C-2299. If C-RT fails to key, refer to troubleshooting chart 17. If 900-Hz tone (C-RT modulation) is not heard, refer to troubleshooting chart 18.
HOW TO PROCEED. Go to block L.		

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

I. ADDITIONAL RADIO COMPONENT REMOTE INPUT POWER CONTROL CHECK

Do this check for all radio sets that have two or more radio components.

Step 25 REMOTE INPUT POWER CONTROL

NOTE

If for substep b, an additional radio component's dial lamp lights, the **link** of that additional component's mounting is probably in **direct.** Check with your supervisor for direction.

a.	Turn A-RT POWER switch to OFF.	a.	A-RT dial lamp should go off. If A-RT's dial lamp remains on, A-R is bad.
b.	Turn **all** additional radio components POWER switches to ON. (Not A-RT.)	b.	Additional radio components dial lamps should **not** light. If an additional radio component's dial lamp lights, the **link** in that component's mount is probably in **direct**
c.	Turn A-RT POWER switch to LOW.	c.	A-RT and additional radio component's dial lamp should ligh If additional radio component's di lamps fail to light, refer to trouble-shooting chart 20.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-45 or -49, cable C-RT as shown in illustration on page 3-92: "RT-524/VRC or -246/VRC RT and RT's Antenna Checks" and then check C-RT starting with block A.
AN/VRC-12, -44, -47 or -48, go to block J.

J. R-442 CHECKS

Do these checks for all radio sets that have R-442's. When radio set is an AN/VRC-44 or -48, first c these checks for B-Receiver and then, **as directed later,** do them again for the C-Receiver.

14. **PROCEDURE USING TEST SET AN/PRM-34.** (CONT)

Step		
Step 26	RECEIVER ANTENNA	
	Setup: 1. Turn A-RT and all R-442 POWER switches to OFF. 2. Connect receiver antenna to AN/PRM-34 and RT as shown in illustration on page 3-93: "Auxiliary Receiver Antenna Check." 3. Turn AN/PRM-34 MODE switch to FWD PWR. 4. Turn A-RT POWER switch to HIGH (allow 2-minute warmup). 5. Tune A-RT to 62.20 MHz.	
	a. Key A-RT; then press down AN/PRM-34 PUSH TO TEST. b. Turn AN/PRM-34 MODE switch to RVS PWR. Key A-RT; then press down AN/PRM-34 PUSH TO TEST. (Unkey before going on.)	a. AN/PRM-34 should indicate (display) between 30 and 65 watts. b. AN/PRM-34 should indicate (display) no more than one-third of the FWD PWR reading. If indication is over one-third, refer to troubleshooting chart 21.
Step 27	AUDIO OUTPUT	
	Setup: 1. Turn A-RT POWER switch to OFF. 2. Connect AN/PRM-34 to R-442 being checked as shown in illustration on page 3-94: "R-442/VRC Receiver Checks." 3. Turn AN/PRM-34 MODE switch to SENS SQ. 4. Controls of R-442 being checked should be preset according to instructions on page 3-90. 5. Connect audio accessories to AUDIO jack of R-442 being checked. 6. Set POWER switch of R-442 being checked to ON-RESET. (If required to turn R-442 on, turn A-RT POWER switch to LOW.)	
	Turn R-442 VOLUME control fully clockwise (cw); then counterclockwise (ccw) to midpoint.	In earphone and speaker (if used): Rushing noise loudness should increase; at full volume rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 22. If rushing noise is not heard in speaker, refer to troubleshooting chart 23.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 28	SQUELCH CONTROL AND CALL LAMP	
	Rotate R-442 SQUELCH switch through all four positions.	a. **OFF positions:** Loud rushing noise should be heard. b. **ON positions:** Rushing noise should b quieted (eliminated). c. **CALL lamp:** Should remain off **for all** positions. If indications are incorrect, R-442 being checked is bad.
Step 29	RECEIVER SENSITIVITY (RECEPTION)	
	Setup: Turn AN/PRM-34 MODE switch to SENS SQ. Direction: For R-442 being checked, starting with 50.00 MHz, do the below listed substeps (a,b and c) for each frequency listed below. Frequency setting: **1.** 50.00, **2.** 45.00, **3.** 40.00, **4.** 35.00 **5.** 30.00, (change BAND switch setting), **6.** 55.00, **7.** 60.00, **8.** 65.00, **9.** 70.00 and **10.** 75.00.	
	a. Turn R-442 SQUELCH switch to OLD OFF; then press down and release AN/PRM-34 PUSH TO TEST several times.	a. **When AN/PRM-34 PUSH TO TEST is pressed**, rushing noise should be quieted and a tone should be heard at audio accessories. **When AN/PRM-34 PUSH TO TEST** is released, rushing noise should be heard. If indications are incorrect, R-442 being checked is bad.
	b. Turn R-442 SQUELCH switch to NEW OFF; then press down and release AN/PRM-34 PUSH TO TEST several times.	b. Indication should be the same as substep a.
	c. One at a time, tune R-442 (in 5-MHz steps) to other nine frequency settings listed. At each setting repeat substeps a and b.	c. For each frequency setting, indications should be same as substeps a and b.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 30 SQUELCH SENSITIVITY

Setup:
1. Tune R-442 being checked to 75.00 MHz.
2. AN/PRM-34 MODE switch should be set at SENS SQ.

a. Turn R-442 SQUELCH switch to NEW ON; then press down and release AN/PRM-34 PUSH TO TEST several times.	a. **When AN/PRM-34 PUSH TO TEST is pressed,** CALL lamp should light; a tone should be heard. **When AN/PRM-34 PUSH TO TEST is released,** CALL lamp should go off and a very short burst of rushing noise should be heard. If indications are incorrect, R-442 being checked is bad.
b. Turn R-442 SQUELCH switch to OLD ON; then press down and release AN/PRM-34 PUSH TO TEST several times.	b. Indication should be the same as substep a.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-44 or -48 where C-Receiver **has not** been checked, check C-Receiver starting with step 27 of block J.
AN/VRC-12, -47 or -44, -48 whose C-Receiver **has** been checked, with:
No R-442 speakers, go to block L.
R-442 speakers, go to block K.

K. R-442 SPEAKER MUTING CHECK

Do this check for **all** radio sets whose R-442 has a speaker.

Step 31 SPEAKER MUTING

Setup:
1. Connect a speaker (LS-454/U) to an AUDIO jack of each R-442.
2. Tune **all** R-442's to 75.00 MHz.
3. Turn **all** R-442 SQUELCH switches to OFF. (Verify rushing noise of all R-442 speakers.)
4. Turn **all** R-442 VOLUME controls, from off, one-quarter turn clockwise.
5. An audio accessory that has a push-to-talk switch should be connected to the A-RT RETRANSMIT (R/W) jack.
6. A-RT should be tuned to 62.20 MHz.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 31 (Cont)	Key RT. (Press/release PTT switch several times.) (Unkey before going on.)	**When RT is keyed,** rushing noise from R-442 speaker(s) should be greatly reduced. **When RT unkeys,** R-442 rushing noise from speaker(s) should return to preset level. If indications are incorrect, refer to troubleshooting chart 24.
HOW TO PROCEED. Go to block L.		

L. DISTANCE CHECK

Do this check for **all** AN/VRC-12 series radio sets.

Step 32	DISTANCE CHECK	
	Setup: Place radio set in its operational environment.	
	Establish communication with another radio set (station) located a prescribed distance away (planning range). (A simple Radio Check will do.)	The distant radio set (station) operator should respond. If response is **not** heard, check siting.
HOW TO PROCEED. Go to block M.		

M. SHUTDOWN OF RADIO SET AFTER CHECK

Do this check for **all** AN/VRC-12 series radio sets.

Step 33	SHUT DOWN RADIO SET	
	Turn A-RT POWER switch to OFF.	All components should stop operating. If A-RT won't stop operating and/or if additional radio components, whose mountings are set up for remote, don't stop operating, A-RT is bad.

3-14. PROCEDURE USING TEST SET AN/PRM-34. (CONT)

Step 33 (Cont)	Direction: 1. Turn all additional radio component POWER switches to OFF. 2. Disconnect AN/PRM-34 test set and march order (repack in carrying case). 3. Recable radio set according to installation instructions, chapter 2, section III.

3-15. PROCEDURE USING TEST SET AN/URM-182.

The AN/URM-182, which includes Wattmeter TS-2609/URM-182, must be used to complete this procedure. Cabling instructions for the AN/URM-182 and TS-2609 switch settings will be given as they apply throughout the procedure.

INITIAL ADJUSTMENTS

WARNING

To safeguard against electrical shock and possible damage to equipment, remove or tape **all** personal exposed metal objects (e.g., watches, rings and medallions).

To prevent possible personnel injury and damage to the equipment, turn all communication component POWER switches to OFF. Depending on the type of vehicle and its actual radio set, turn to OFF the following:

NOTE

Refer to illustration of typical installation on page 2-6.

1. Switch box assembly (if included in cab compartment)
2. RT unit (RT-524/RT-246) POWER switches
3. R-442 POWER switches
4. C-2742 PWR SW (power switches)

CAUTION

Do not start vehicle engine with radio set turned on. Make certain that **all** components that have POWER switches are turned to OFF. Starting a vehicle engine with the radio components turned on can cause serious damage to the components.

INSTALLATION CHECKS

Refer to chapter 1, section II of this manual or an appropriate 2300 series TM to insure that all items of equipment of the radio set are properly installed and that all cables are properly routed and connected.

NOTE

TM 11-5820-401-10-1-HR contains example hand receipts that, based on the actual vehicle and radio set configuration, can be used to inventory items of equipment and determine National stock numbers (NSN's).

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

PRESET CONTROLS

To establish a logical starting point for the evaluation procedure, the controls of the components of th radio set must be preset according to the following preparatory actions.

RECEIVER-TRANSMITTERS, RT-524/VRC AND RT-246/VRC

Set the controls of **all** Receiver - Transmitters as follows:

1. Turn BAND switch to 30-52 (A)
2. Turn LIGHT switch to ON.
3. Turn SPEAKER switch to ON (RT-524 only).
4. Tune MC-TUNE-KC controls for 50.00 MHz.
5. Turn SQUELCH switch to OLD OFF.
6. Turn VOLUME control fully counterclockwise to no volume.

NOTE

Objectionable interference may result when RT is tuned to 33.90, 45.20, 56.50, and 67.80 MHz. Avoid tuning RT to these frequencies.

RECEIVERS R-442/VRC (WHEN INCLUDED)

Set the controls of **all** auxiliary receiver as follows:

1. Turn BAND switch to 30-52 (A)
2. Turn LIGHT switch to ON.
3. Tune MC-TUNE-KC controls for 50.00 MHz.
4. Turn VOLUME control fully counterclockwise to no volume.
5. Turn SQUELCH switch to OLD OFF.

RETRANS BOX, C-2299/VRC (WHEN INCLUDED)

Set the controls of **all** RETRANS boxes as follows:

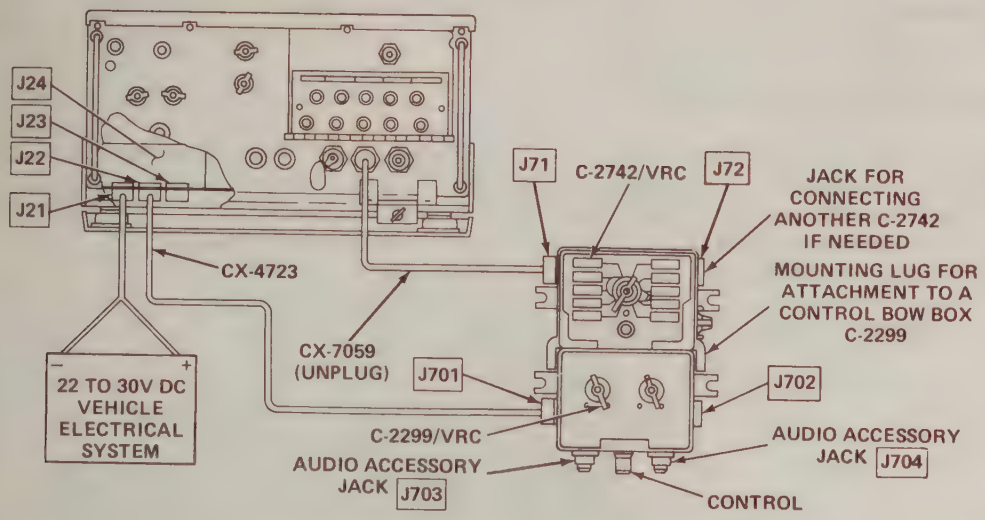
1. Turn RAD TRANS switch to 1.
2. Turn RETRANS switch to OFF.
3. Turn VOLUME control fully clockwise to maximum volume.

NOTE

The C-2299 retrans box, though used primarily for a retrans function of the AN/VRC-49 and -45, also can be used as a convenience box for the connection of audio accessories for the six AN/VRC-12 configurations.

5. PROCEDURE USING TEST SET AN/URM-182. (CONT)

2742/VRC REMOTE BOX AND C-2299/VRC RETRANS BOX



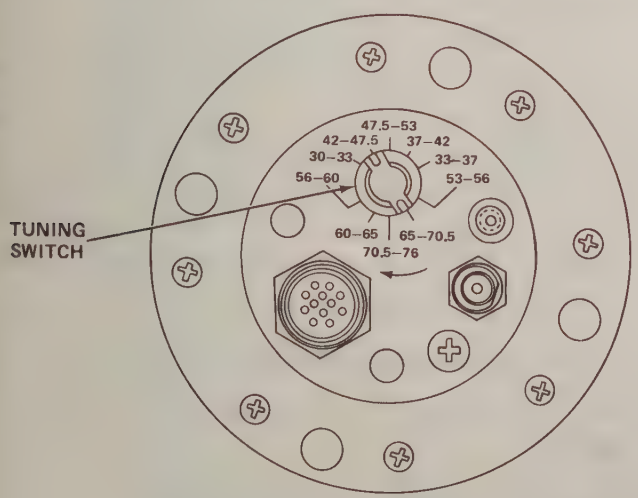
he C-2742/VRC remote box is sometimes mounted on top of the C-2299/VRC retrans box. The mote box enables the operator to control the RT-246 dc input power, its transmit rf ower level, and select preset channels of the RT-246/VRC from a remote (cab compartment) cation.

this case, the C-2299/VRC provides a remote connection for the RT-246 audio accessories.

EMOTE BOX, C-2742/VRC (WHEN INCLUDED)

nplug **all** CX-7059 cables from their RT-246 REMOTE jacks.

ANTENNA MATCHING UNITS MX-6707/VRC AND MX-2799/VRC



FREQUENCY RANGES

30 – 33	53 – 56
33 – 37	56 – 60
37 – 42	60 – 65
42 – 47.5	65 – 70.5
47.5 – 53	70.5 – 76

EL8NZ014

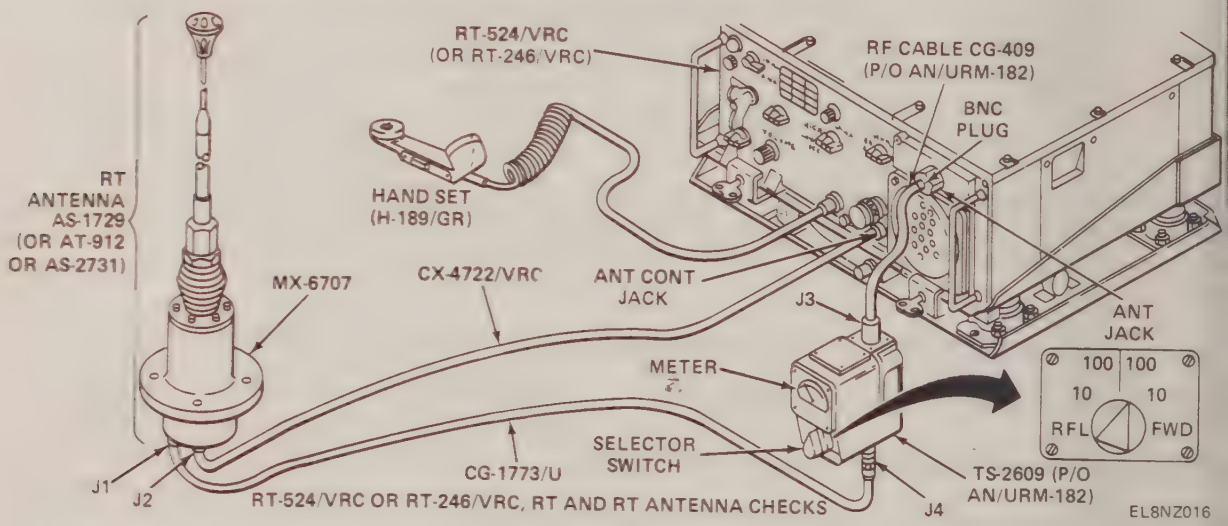
3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

If possible, on MX-6707, manually turn the frequency range tuning switch to 47.5-53 MHz. (This setting corresponds with the RT frequency setting of 50 MHz.) The MX-2799 requires no presetting.

AN/URM-182 (TS-2609) TEST SET CABLING

The TS-2609/URM-182 is an in-line wattmeter that is used to check the rf transmit power levels of the RT-524 and RT-246, and the effectiveness of the RT's antenna and auxiliary receiver's antenna. For any one of the radio sets being checked, first connect the wattmeter in-line with the A-RT antenna according to the first illustration below and then, **as directed later** connect it in-line with the other antennas.

RT-524/VRC OR -246/VRC, RT AND RT ANTENNA CHECKS



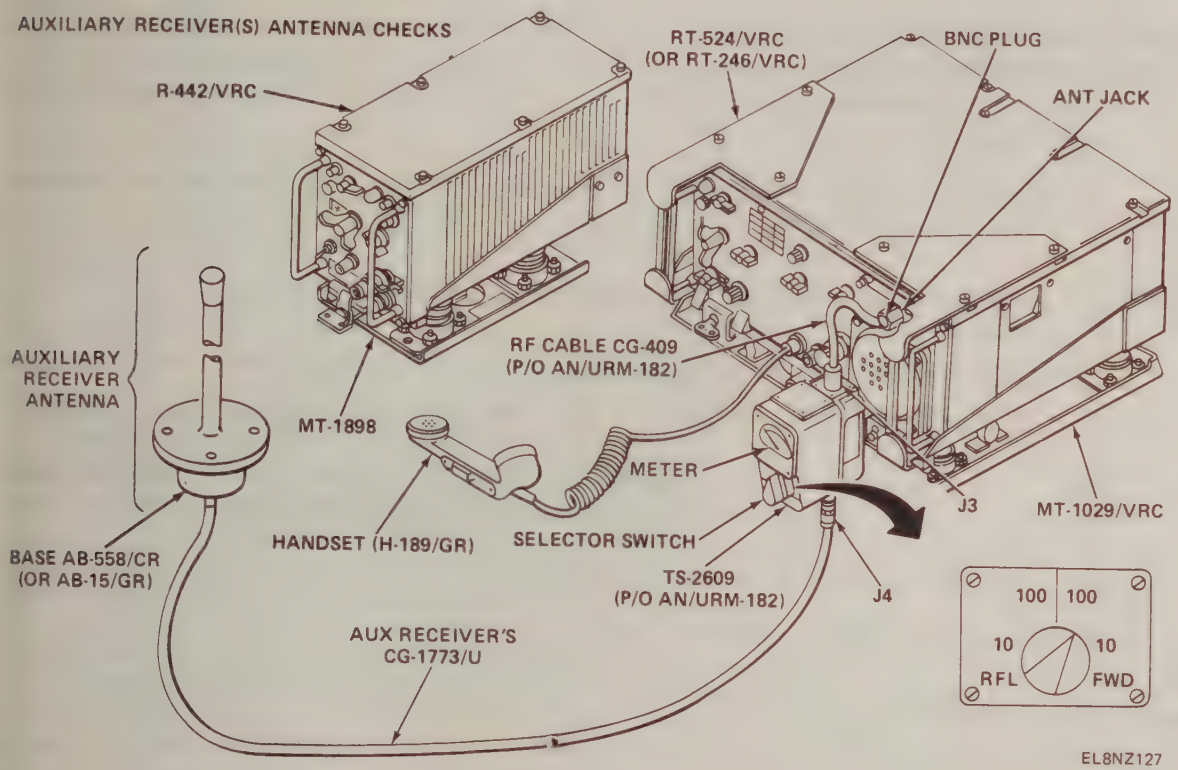
FROM				TO		
CABLE	COMPONENT	JACK	CABLE PLUG	COMPONENT	JACK	CABLE PLUG
CG-409	TS-2609	J3		A-RT	ANT	
CG-1773/RT	TS-2609	J4		Matching Unit	J-1	
CX-4722/VRC	A-RT	ANT CONT	P1	Matching Unit	J-2	P2

NOTE

Set the meter SELECTOR SWITCH on the TS-2609 to 100 FWD position.

5. PROCEDURE USING TEST SET AN/URM-182. (CONT)

XILIARY RECEIVERS ANTENNA CHECKS



FROM				TO		
CABLE	COMPONENT	JACK	CABLE PLUG	COMPONENT	JACK	CABLE PLUG
-409	TS-2609	J3	P1	A-RT	ANT	P2
-1773 (Aux Receiver)	TS-2609	J4	P1	Aux Receiver Antenna Base AB-558/GR or AB-15/GR	558	P2

NOTE

Set the meter SELECTOR switch on the TS-2609 to 100 FWD position.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

A. RT INPUT POWER, INITIAL RECEIVE, AND INITIAL MATCHING UNIT (MX) CONTROL CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 1	INPUT POWER	
	NOTE For this check, if matching unit was **not** initially preset, matching unit switching sound may be heard.	
	Turn RT POWER switch to HIGH .	RT dial lamp should light. If lamp fails to light, refer to troubleshooting chart 1. If RT keys (blower runs and FWD PWR chec indicates rf transmit power), refer to troubleshooting chart 6.
	Direction: Allow 2-minute warmup.	
Step 2	AUDIO OUTPUT	
	Setup: Appropriate audio accessories should be connected to RT being checked.	
	Turn RT VOLUME control fully clockwise (cw), then counterclockwise (ccw) to midpoint.	In earphone and speaker: Rushing noise loudness should increase. At full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 2. If rushing noise is not heard in speaker, refer to troubleshooting chart 3.

5. **PROCEDURE USING TEST SET AN/URM-182.** (CONT)

ep 3	INITIAL MATCHING (MX) UNIT CONTROL	
	Turn RT BAND switch to other setting; then **return** to original setting.	Switching sound should be heard at matching unit. (For the MX-6707, the range setting should agree with the RT MC setting.) If matching unit fails to switch, or switching won't stop, refer to trouble-shooting chart 4.
OW TO PROCEED. Go to block B.		

RT RECEIVER AND SQUELCH CHECKS

these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these ecks for the A-RT and then **as directed later** do them again for the C-RT.

ep 4	SQUELCH CONTROL AND CALL LAMP	
	Rotate RT SQUELCH switch through all four positions.	a. **OFF positions**: A loud rushing noise should be heard. b. **ON positions**: The rushing noise should be quieted (eliminated). c. **CALL lamp**: Should remain OFF for **all** positions. If indications are not correct, RT being checked is bad.
ep 5	RECEIVER (RECEPTION) AND SQUELCH SENSITIVITY	
	Setup: Tune RT being checked to receive a NET frequency.	

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 5 (Cont) RECEPTION

Rotate RT SQUELCH switch through all four positions.	a. **OFF positions**: Rushing noise should be quieted and voice signals should be heard loud and clear. CALL lamp should remain off. If indications are incorrect, refer to troubleshooting chart 25.

SQUELCH SENSITIVITY AND CALL LAMP

Rotate RT SQUELCH switch through all four positions.	b. **ON positions**: The CALL lamp should light and voice signals should be heard loud and clear. If in this step, substep a is correct but substep b is incorrect, RT being checked is bad.

HOW TO PROCEED. Go to block C.

C. RT KEYING AND MUTING CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 6 KEYING

Setup:
For RT being checked:
1. Turn SQUELCH SWITCH to OLD OFF.
2. Tune to a frequency other than a NET frequency.
3. POWER switch should be at LOW.

CAUTION

For this check, **do not** key RT when antenna is disconnected. When keyed, if blower does not run, **do not** keep RT keyed for more than 3 seconds.

5. **PROCEDURE USING TEST SET AN/URM-182.** (CONT)

p 6 nt)	Key RT. (Press/release the PTT switch several times.) (Unkey RT before going on.)	**When PTT is pressed**, RT relays should click, blower should run; rushing noise should drastically reduce. If RT fails to key, refer to trouble-shooting chart 5. **When PTT is released**, relays should again click; rushing noise should return, blower might stop running. If RT remains keyed, refer to trouble-shooting chart 6.
ep 7	MUTING	
	With RT speaker on (VOLUME at mid-point), again key RT. (Unkey RT before going on.)	With mike at about 10 inches from speaker, there should be **no** audio feedback (squeal). If feedback occurs, RT being checked is bad.
OW TO PROCEED. When RT being checked is an: -246, go to block D -524, go to block F.		

RT-246 SERVO TUNE (AUTOMATIC TUNING) CHECK

this check for all RT-246s. When radio set is an AN/VRC-45, first do this check for e A-RT and then **as directed later** do them again for the C-RT.

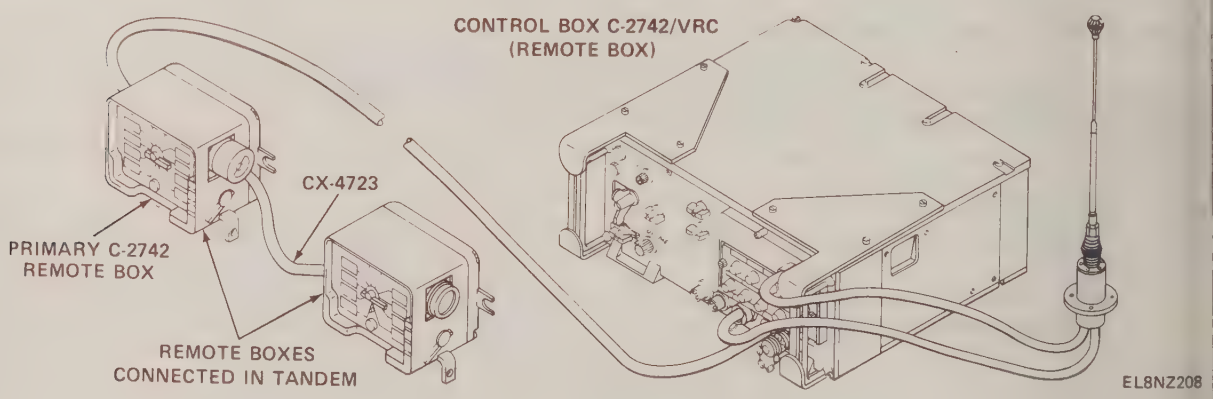
ep 8	AUTOMATIC TUNE
	Setup for RT being checked: Turn BAND switch to AUTO. **NOTE** Instructions for presetting RT-246 pushbuttons are on closed side of the pushbutton hinged cover. Refer to sample DA Form 2404 (page 3-127) of block F for ten frequencies to be preset.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 8 (Cont)	a. Using the ten frequencies given, preset frequency 1 on pushbutton (1), frequency 2 on pushbutton (2), etc, until all ten are preset.	a. The preset frequency should appear in RT dial-frequency window as presetting is accomplished. MX switching sound should be heard.
	b. In descending order, press each pushbutton, **but allow each tuning cycle to complete before pressing another pushbutton.**	b. RT MC-TUNE-KC controls should change to preset frequency. MX switching sound should be heard. If RT fails to tune, RT being checked is bad. If, for any preset frequency, MX fails to switch or won't stop switching, refer to troubleshooting chart 4.
HOW TO PROCEED. When RT-246 being checked has: C-2742's, go to block E. **No** C-2742's, go to block F.		

E. RT-246/REMOTE BOX, C-2742 INTERFACE CHECKS

Do these checks for all RT-246's that have C-2742's. When radio set is an AN/VRC-45, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.



When two remote boxes C-2742 are in tandem, first check the box directly connected to the RT (primary C-2742).

5. **PROCEDURE USING TEST SET AN/URM-182.** (CONT)

Step 9	R-246 REMOTE INPUT POWER CONTROL	
	Setup: For RT-246 being checked: 1. Press in RT-246 pushbutton (1) (allow tuning cycle to complete). 2. Turn RT POWER switch to OFF. 3. Replug CX-7059 cables to appropriate RT REMOTE jack. 4. Unlock **all** C-2742 knob stops. 5. Turn **all** C-2742 CHAN SEL switches to channel 1 (lower left write-in space). 6. **All** C-2742 PWR SW (power switches) should be at OFF. 7. If two C-2742's are in tandem, unplug CX-4723 from primary C-2742 (J72).	
	a. Turn RT POWER switch to REMOTE.	a. RT should remain off. If RT comes on, refer to troubleshooting chart 7.
	b. Turn C-2742 PWR SW to LO then press back and release C-2742 SW (toggle switch).	b. RT dial lamp and C-2742 control lamp should light. (C-2742 lamp might come on without pressing PWR SW.) If lamps fail to light, refer to trouble-shooting chart 8.
Step 10	RT-246 HIGH/LOW TRANSMIT RF POWER CONTROL	
	Turn C-2742 PWR SW to HI; then to LO several times.	RT high/low power relay should click each time C-2742 PWR SW is changed. If relay fails to click, refer to troubleshooting chart 9.
Step 11	RT-246 REMOTE FREQUENCY SELECTION	
	In turn, **but allow each tuning cycle to complete**, turn C-2742 CHAN SEL switch to each of its positions.	RT MC-TUNE-KC controls and BAND switch (as appropriate) should change according to the ten RT-246 preset frequencies. (MX switching should occur.) If RT tunes to a wrong frequency or won't stop tuning, refer to troubleshooting chart 10. If RT fails to change frequency, refer to troubleshooting chart 11.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 11 (cont)	Direction: When C-2742's are in tandem, replug CX-4723 to primary C-2742, (J72). Repeat steps 9b, 10 and 11 (above) for the second C-2742. (The primary C-2742 PWR SW **must** remain at LO or HI.) Upon completion, go to step 12 below.	
Step 12	RT-246 REMOTE INPUT POWER CONTROL SHUTDOWN	
	a. Turn primary C-2742's PWR SW to OFF. b. Turn RT POWER switch to LOW.	a. RT should stop operating. If RT continues to operate, refer to troubleshooting chart 7. b. RT dial lamp should light. If lamp fails to light, RT being checked is bad.
HOW TO PROCEED. Go to block F.		

F. RT TRANSMITTER RF POWER LEVELS AND ANTENNA CHECKS

Do this check for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

CAUTION

Insure that all antenna components and cables are connected to the appropriate RT.

NOTE

During the checks of block F, specific RT data must be recorded. This data is in addition to other maintenance actions recorded on the reporting DA Form 2404. Refer to the following illustration for layout format of this additional worksheet.

5. PROCEDURE USING TEST SET AN/URM-182. (CONT)

ADDITIONAL DA FORM 2404

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET
For use of this form see TM 38 750 the proponent agency is the Office of the Deputy Chief of Staff for Logistics.

1 ORGANIZATION		2 NOMENCLATURE AND MODEL			
3 REGISTRATION/SERIAL NSN (RT Serial no.)	4a MILES	b (RT Model no. (e.g. RT-524, RT-246))	5 DATE	6 TYPE INSPECTION	
7					
TM NUMBER	TM DATE	TM NUMBER			

COLUMN a — Enter TM item number.

COLUMN b — Enter the applicable condition status symbol.

COLUMN c — Enter deficiencies and shortcomings.

COLUMN d — Show corrective action for deficiency or shortcoming listed in Column c.

COLUMN e — Individual ascertaining completed corrective action initial in this column.

STATUS SYMBOLS

"X" — Indicates a deficiency in the equipment that places it in an inoperable status.

CIRCLED "X" — Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.

HORIZONTAL DASH "(-)" — Indicates that a required inspection, component replacement, maintenance operation check or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.

DIAGONAL "(/)" — Indicates a material defect other than a deficiency which must be corrected to increase deficiency or to make the item completely serviceable.

LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL Indicates that a completely satisfactory condition exists.

FOR AIRCRAFT Status symbols will be recorded in red.

ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.

8a. SIGNATURE (Person(s) performing inspection)	8b. TIME	9a. SIGNATURE (Maintenance Supervisor)	9b. TIME	10. MANHOURS REQUIRED

TM ITEM NO a	STATUS b	DEFICIENCIES AND SHORTCOMINGS c	CORRECTIVE ACTION d	INITIAL WHEN CORRECTED e
1	75.00	a.____ FWD b.____ RFL	6. 31.45 a.____ FWD b.____ RFL	
2	67.05	a.____ FWD b.____ RFL	7. 35.60 a.____ FWD b.____ RFL	
3	62.20	a.____ FWD b.____ RFL	8. 39.65 a.____ FWD b.____ RFL	
4	58.25	a.____ FWD b.____ RFL	9. 44.80 a.____ FWD b.____ RFL	
5	54.40	a.____ FWD b.____ RFL	10. 50.85 a.____ FWD b.____ RFL	

DA FORM 1 APR 79 2404 Replaces edition of 1 Jan 64 which will be used

EL8NZ206

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 13 HIGH-LEVEL RF TRANSMIT POWER AND ANTENNA

Setup:
1. Prepare a worksheet (DA Form 2404). See illustration on previous page.
2. Turn POWER switch of RT being checked to HIGH.
3. TS-2609 SELECTOR switch should be at 100 FWD.

NOTE

To obtain a valid check, the vehicle should be in a clear area of at least a 25-foot radius from the RT antenna.

Direction:
For RT being checked, starting with 75.00 MHz, do the substeps (a thru d) for each frequency listed on worksheet.

CAUTION

Do not change RT tuning when RT is keyed.

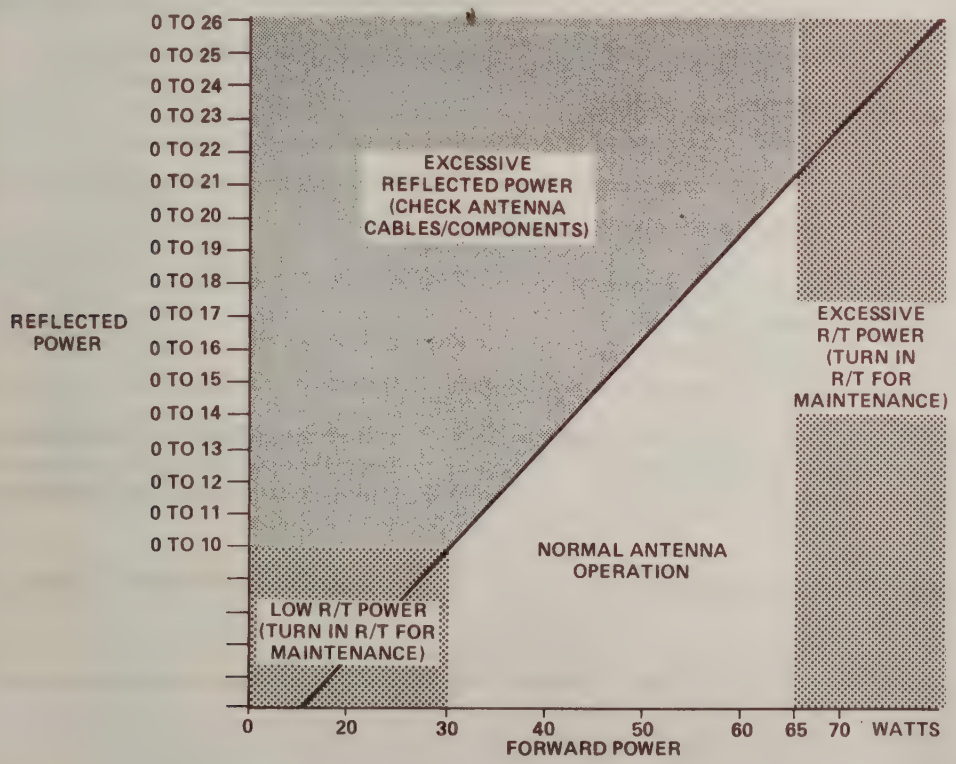
a. As RT frequency is changed, listen for matching unit switching.	a. MX switching sound should be heard when RT MC setting is changed. If for any setting, MX fails to switch or won't stop switching, refer to troubleshooting chart 20.
b. Key RT and observe TS-2609 meter reading. (On worksheet, next to appropriate listed frequency, record TS-2609 reading at substep a.) Unkey RT.	b. TS-2609 should indicate between 30 a 65 watts. EXAMPLE: 75.00 MHz 40 FWD Regardless of reading, complete substeps c and d before referring to troubleshooting conclusions at end of this step.

Direction:
For this substep, when initial reading is less than 10, hold the TS-2609 SELECTOR switch in 10RFL (RT keyed).

5. PROCEDURE USING TEST SET AN/URM-182. (CONT)

ep 13 ont)	c. Turn TS-2609 SELECTOR switch to 100 RFL, key RT and observe the meter reading. (On worksheet, next to appropriate listed frequency, record TS-2609 reading at substep b.) Unkey RT.	c. TS-2609 should indicate **no more** than one-third of FWD PWR reading. EXAMPLE: 75.00 MHz a. $\frac{40}{\text{FWD}}$ b. $\frac{13.3}{\text{RFL}}$
	d. One at a time, tune RT being checked to other nine frequency settings listed on worksheet. At each frequency setting, repeat substep a through c and complete worksheet as directed.	d. For each frequency setting, indications should be the same as substeps a through c. Troubleshooting conclusions: If, for any frequency setting: RFL PWR is more than one-third of FWD PWR reading, regardless of the FWD PWR reading, refer to troubleshooting chart 12. RFL PWR is less than one-third of FWD PWR (okay) **but** FWD PWR is less than 30 watts or more than 65 watts, RT being checked is bad.

RANSMITTED FORWARD-VS-REFLECTED POWER CHART (RT POWER SWITCH AT HIGH)



EL8NZ191

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 14	LOW-LEVEL RF TRANSMIT POWER	
	Setup: 1. Tune RT being checked to a frequency other than a NET frequency. 2. Turn POWER switch of RT being checked to LOW. 3. Turn TS-2609 SELECTOR switch to 100 FWD. **NOTE** For this step, when the initial indication is less than 10 watts, hold TS-2609 SELECTOR switch in the 10 FWD position (RT keyed).	
	a. Key RT. (Unkey RT before going on.) b. Change RT BAND switch to other position; then key RT. (Unkey RT before going on.)	a. TS-2609 should indicate 0.5 to 10 watts. If indication is incorrrect, RT being checked is bad. b. Indication should be the same as substep a.
	HOW TO PROCEED. Go to block G.	

G. RT MODULATION, SIDETONE AND TRANSMITTER FREQUENCY ACCURACY CHECKS

Do these checks for all RT's. When radio set is an AN/VRC-45 or -49, first do these checks for the A-RT and then **as directed later** do them again for the C-RT.

Step 15	150-Hz SIDETONE AND MODULATION	
	Setup for RT being checked: POWER switch should be at LOW.	
	Key RT; while keyed, turn RT SQUELCH switch through all four positions. Listen to earphone. (Unkey RT before going on).	150-Hz sidetone should be heard in earphone for all SQUELCH positions **except** OLD ON. (Adjust RT VOLUME as (required). If sidetone is not heard, RT being checked is bad.

5. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 16	VOICE SIDETONE AND MODULATION	
	Key RT and initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in earphone. (Adjust RT VOLUME as required.) If sidetone is not heard, RT being checked is bad.
Step 17	TRANSMITTER FREQUENCY ACCURACY	
	Setup: For RT being checked: 1. Tune to a NET frequency. 2. Turn SQUELCH switch to NEW ON. **NOTE** If, for this check, the distant receiver's front panel **cannot** be seen, initiate a radio check with distant station. For this check, when communication cannot be established in LOW power, turn POWER switch of RT being checked to HIGH and repeat this step.	
	Key RT and initiate a radio check. (Unkey RT before going on.)	CALL lamp should light at test receiver or NET operator should respond. If indications are incorrect, check siting; if okay, RT being checked is bad.

OW TO PROCEED. When radio set being checked is an:
N/VRC-12,-43,-44,-46,-47 or -48 **with** C-2299 or AN/VRC-45 or 49 whose C-RT **has** been checked, go to block H.
N/VRC-12,-44,-47 or -48 **without** C-2299 or AN/VRC-45 or -49 whose C-RT **has not** been checked, go to block I.
N/VRC-43 or -46 **without** C-2299, go to block L.

. RELAY BOX, C-2299, CHECKS

o these checks for all radio sets that have C-2299's.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 18	A-RT AUDIO OUTPUT	
	Setup: 1. C-2299 should be preset according to instructions on page 3-116. 2. Turn **all** RT speakers to OFF. 3. Turn **all** RT SQUELCH switches to NEW ON. 4. **All** RT POWER switches should be at LOW. 5. Connect an RT audio accessory to C-2299 audio jack.	
	NOTE IAW means "In Accordance With". This term applies throughout these checks.	
	a. Turn A-RT SQUELCH switch to NEW OFF; then vary A-RT VOLUME control. Return A-RT VOLUME control to midpoint.	a. As heard in C-2299 earphone, loudness of rushing noise should vary IAW VOLUME setting. If rushing noise is not heard, refer to troubleshooting chart 13.
	b. Vary C-2299 VOLUME control. Return to fully cw position (full volume).	b. Same as substep a.
Step 19	A-RT KEYING	
	Key A-RT. (Press/release PTT switch of audio accessory connected to C-2299 several times.) (Unkey RT before going on.)	**When PTT is pressed,** A-RT relays should click, A-RT blower should run; rushing noise should be drastically reduced. If A-RT fails to key, refer to trouble-shooting chart 14. **When PTT is released,** A-RT relays should again click, rushing noise should return; A-RT blower might stop running. If A-RT remains keyed, refer to trouble-shooting chart 6.
Step 20	A-RT MODULATION	
	Key A-RT; initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in ear-phone connected to C-2299. If sidetone is not heard, refer to troubleshooting chart 15.

5. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 20 (cont) HOW TO PROCEED. When radio set being checked is an: A/VRC-12,-44,-47 or -48, go to block I. -/VRC-45, or -49 (both RT's checked), complete steps 21 through 24. A/VRC-43 or -46, go to block L.	
Step 21 C-RT AUDIO OUTPUT	
Setup: 1. Turn A-RT SQUELCH switch to NEW ON. 2. Turn C-2299 RAD TRANS switch to 2.	
a. Turn C-RT SQUELCH switch to NEW OFF; then vary C-RT VOLUME control. Return C-RT VOLUME control to midpoint.	a. As heard in C-2299 earphone, loudness of rushing noise should vary IAW VOLUME setting. If rushing noise is not heard, refer to troubleshooting chart 13.
b. Vary C-2299 VOLUME control. Return to fully cw position (full volume).	b. Same as substep a.
Step 22 C-RT KEYING	
Key C-RT. (Press/release PTT switch of audio accessory connected to C-2299 several time.) (Unkey RT before going on.)	**When PTT is pressed,** C-RT relays should click, C-RT blower should run; rushing noise should be drastically reduced. If C-RT fails to key, refer to trouble-shooting chart 14. **When PTT is released,** C-RT relays should click again, rushing noise should return; C-RT blower might stop running. If C-RT remains keyed, refer to troubleshooting chart 6.
Step 23 C-RT MODULATION	
Key C-RT; initiate a radio check. (Unkey RT before going on.)	Voice sidetone should be heard in earphone connected to C-2299. If sidetone is not heard, refer to troubleshooting chart 15.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 24	RELAY (RETRANSMISSION)	
	Setup: 1. Turn **both** RT SQUELCH switches to NEW ON. 2. **Both** RT POWER switches should be at LOW. 3. Tune C-RT to 50.85 MHz. 4. Tune A-RT to 73.85 MHz. 5. Turn C-2299 RAD TRANS switch to 1.	
	A-RT TRANSMITTER/C-RT RECEIVER	
	a. Turn C-2299 RETRANS switch to ON.	a. Both RT's should remain unchanged. If indications are incorrect, refer to troubleshooting chart 16.
	b. Turn C-RT SQUELCH switch to NEW OFF. At C-RT RETRANS (R/N) jack, short pin E to ground.	b. C-RT CALL lamp should light. A-RT should key and rushing noise (A-RT modulation) should be heard in earphone connected to C-2299. If A-RT fails to key, refer to troubleshooting chart 17. If rushing noise (A-RT modulation) is **not** heard, refer to troubleshooting chart 18.
	c. At C-RT remove short (pin E to ground). Turn C-RT SQUELCH switch to NEW ON.	c. C-RT CALL lamp should go out. A-RT should unkey, rushing noise should not be heard. If indications are incorrect, refer to troubleshooting chart 16.
	C-RT TRANSMITTER/A-RT RECEIVER	
	Setup: Turn C-2299 RAD TRANS switch to 2.	

5. **PROCEDURE USING TEST SET AN/URM-182.** (CONT)

p 24 ont)	d. Turn A-RT SQUELCH switch to NEW OFF. At A-RT RETRANS (R/W) jack, short pin E to ground.	d. A-RT CALL lamp should light. C-RT should key and rushing noise (C-RT modulation) should be heard in earphone connected to C-2299. If C-RT fails to key, refer to troubleshooting chart 17. If rushing noise (C-RT modulation) is **not** heard, refer to troubleshooting chart 18.
	e. At A-RT, remove short (pin E to ground). Turn A-RT SQUELCH switch to NEW ON.	e. A-RT CALL lamp should go out. C-RT should unkey and rushing noise should be heard. If indications are incorrect refer to troubleshooting chart 16.
	Direction: Turn C-2299 RETRANS switch to OFF.	

)W TO PROCEED. Go to block L.

ADDITIONAL RADIO COMPONENT REMOTE INPUT POWER CONTROL CHECK

) this check for **all** radio sets that have two or more radio components.

ep 25 REMOTE INPUT POWER CONTROL

NOTE

If for substep b, an additional radio component's dial lamp lights, the **link** of that additional component's mount is probably in **direct.** Check with your supervisor for direction.

a. Turn A-RT POWER switch to OFF.	a. A-RT dial lamp should go off. If dial lamp remains on, A-RT being checked is bad.
b. Turn **all** additional radio component's POWER switches to ON.	b. Additional radio component's dial lamps should **not** light. If additional radio component's mounting is set for **remote** and that radio component's dial lamp lights, refer to troubleshooting chart 19.

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 25 (Cont)	c. Turn A-RT POWER switch to LOW.	c. A-RT and additional radio component's dial lamps should light. If additional radio component's dial lamps fail to light, refer to trouble-shooting chart 20.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-45 or -49, cable C-RT as shown in illustration on page 3-118: "RT-524/VRC or -246/VRC RT and RT's Antenna Checks" and then check C-RT starting with block A.
AN/VRC-12, -44, -47 or -48, go to block J.

J. R-442 CHECKS

Do these checks for all radio sets that have R-442's. When radio set is an AN/VRC-44 or -48, first do these checks for B-Receiver and then **as directed later,** do them again for C-Receiver.

Step 26 RECEIVER ANTENNA

Setup:
1. Turn A-RT and **all** R-442 POWER switches to OFF.
2. Connect receiver antenna to AN/URM-182 and RT as shown in illustration on page 3-119: "R-442 Antenna Check."
3. Turn TS-2609 SELECTOR switch to 100 FWD.
4. Turn A-RT POWER switch to HIGH (allow 2-minute warmup).
5. Tune A-RT to 62.20 MHz.

a. Key A-RT and observe TS-2609 meter reading.	a. TS-2609 should indicate between 30 an 65 watts.
b. Turn TS-2609 SELECTOR switch to 100 RFL, then key RT and observe meter reading. (If RFL reading is 10 or less, turn TS-2609 SELECTOR switch to 10 RFL.) (Unkey RT before going on.)	b. TS-2609 RFL reading should be **no mor** than one-third of FWD PWR reading. If indication is over one-third, refer to troubleshooting chart 21.

PROCEDURE USING TEST SET AN/URM-182. (CONT)

27	AUDIO OUTPUT	
	Setup: 1. Turn A-RT POWER switch to OFF. 2. Controls of R-442 being checked should be preset according to instructions on page 3-116. 3. Connect audio accessories to AUDIO jack of R-442 being checked. 4. Set POWER switch of R-442 being checked to ON-RESET. (If required to turn **R-442 on,** turn A-RT POWER switch to LOW.)	
	Turn R-442 VOLUME control fully clockwise (cw); then counterclockwise (ccw) to midpoint.	In earphone and speaker (if used), rushing noise loudness should increase; at full volume, rushing noise should be loud. As VOLUME control is turned ccw, rushing noise loudness should decrease. If rushing noise is not heard in earphone, refer to troubleshooting chart 22. If rushing noise is not heard in speaker, refer to troubleshooting chart 23.
p 28	SQUELCH CONTROL AND CALL LAMP	
	Rotate R-442 SQUELCH switch through all four positions.	a. **OFF positions:** Loud rushing noise should be heard. b. **ON positions:** Rushing noise should be quieted (eliminated). c. **CALL lamp:** Should remain off **for all** positions. If indications are incorrect, R-442 being checked is bad.
p 29	RECEIVER (RECEPTION) AND SQUELCH SENSITIVITY	
	Setup: Tune R-442 being checked to receive a NET frequency.	

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

Step 29 (Cont)	RECEPTION	
	a. Rotate R-442 SQUELCH switch through **all** four positions.	a. **OFF position.** Rushing noise should b quieted and voice signals should be heard loud and clear. CALL lamp sho remain off. If indications are incorrect, R-442 being checked is bad.
	SQUELCH SENSITIVITY AND CALL LAMP	
	b. Rotate R-442 SQUELCH switch through **all** four positions.	b. **ON position.** Call lamp should light and voice signals should be heard lou and clear. If indications are incorrect, R-442 being checked is bad.

HOW TO PROCEED. When radio set being checked is an:
AN/VRC-44 or -48 whose C-Receiver has **not** been checked, check C-Receiver starting with step 27 of block J.
AN/VRC-12, -47, or -44, -48 whose C-Receiver **has** been checked with:
No R-442 speakers, go to block L.
R-442 speakers, go to block K.

K. R-442 SPEAKER MUTING CHECK

Do this check for **all** radio sets whose R-442 has a speaker.

Step 30	SPEAKER MUTING, RT KEYED	
	Setup: 1. Connect a speaker (LS-454/U) to an AUDIO jack of each R-442. 2. Tune **all** R-442's to 75.00 MHz. 3. Turn **all** R-442 SQUELCH switches to OFF. (Verify rushing noise of all R-442 speakers.) 4. Turn **all** R-442 VOLUME controls, from off, one-quarter-turn clockwise. 5. An audio accessory that has a PUSH TO TALK switch should be connected to A-RT RETRANSMIT (R/W) jack. 6. A-RT should be tuned to 62.20 MHz.	

PROCEDURE USING TEST SET AN/URM-182. (CONT)

30 t)	Key RT (Press/release PTT switch several times.) (Unkey RT before going on.)	**When RT is keyed,** rushing noise from R-442 speaker(s) should be greatly reduced. **When RT unkeys,** R-442 rushing noise from speakers should return to preset level. If indications are incorrect, refer to troubleshooting chart 24.
V TO PROCEED. Go to block L.		

DISTANCE CHECK

his check for **all** AN/VRC-12 series radio sets.

) 32	DISTANCE CHECK	
	Setup: Place radio set in its operational environment.	
	Establish communication with another radio set (station) located a prescribed distance away (planning range). (A simple Radio Check will do.)	The distant radio set (station) operator should respond. If response is **not** heard, check siting.
W TO PROCEED. Go to block M.		

3-15. PROCEDURE USING TEST SET AN/URM-182. (CONT)

M. SHUTDOWN OF RADIO SET AFTER CHECK

Do this check for **all** AN/VRC-12 series radio sets.

Step 33 SHUT DOWN RADIO SET		
	Turn A-RT POWER switch to OFF.	All components should stop operating. If A-RT won't stop operating, and/or additional radio components whose mountings are set up for remote won't stop operating, A-RT being checked is bad.
	Direction: 1. Turn **all** additional radio components POWER switches to OFF. 2. Disconnect the AN/URM-182 test set and march order (repack in carrying case). 3. Recable radio set according to installation instructions, chapter 2, section III.	

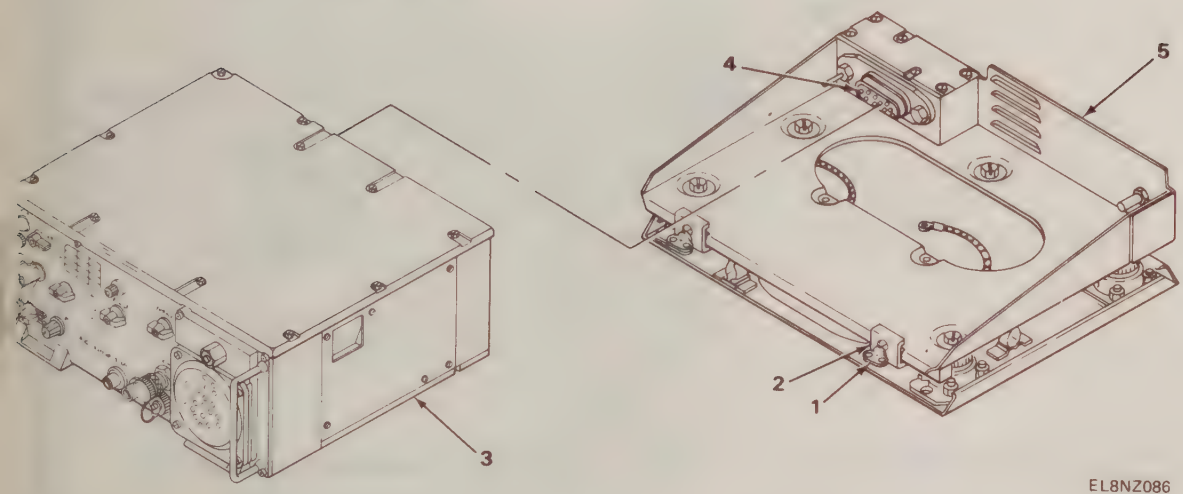
RT-246(*)/VRC AND RT-524(*)/VRC.

OVAL OF RT

LS: Tool Kit, Electronic Equipment TK-101/G
LIMINARY PROCEDURE: Turn RT POWER switch to OFF.
Remove cables from RT.

WARNING

The RT weighs 61 pounds. Two technicians should lift the RT.



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Unscrew two thumbscrews (1) to lower clamp (2). Turn thumbscrews counterclockwise (ccw).
Pull RT (3) forward until rear of RT (3) is clear of radio jack (J24) (4).

CAUTION

Use both handles or guards to pull and then lift RT to prevent equipment damage.

Be careful to slide the RT into (or out of) the MT-1029/VRC. Damage to the radio jack (J24) can occur.

3. Lift RT (3) from mounting (5).

PLACEMENT OF RT

r replacement of RT, see paragraph 2-11.

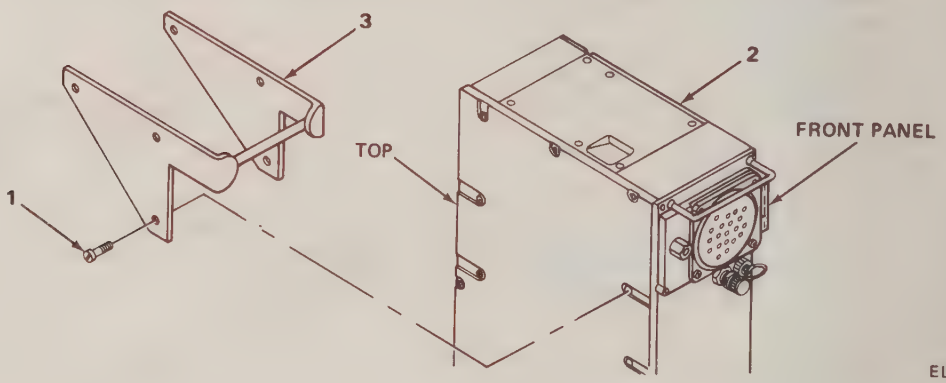
3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

INSTALLATION OF HANDLE ASSEMBLY

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Place RT on its side on floor.

CAUTION

Do not set RT on its rear panel. Damage to the RT blower could result.



NOTE

Due to bolt configuration on bottom of RT, left and right handle assemblies cannot be interchanged.

1. Using screwdriver, loosen and remove six screws (1) from top and bottom of RT (2).
2. Position top and bottom of handle assembly (3) on RT (2) and aline holes.
3. Using screwdriver, insert and tighten six screws (1) in top and bottom of handle assembly.
4. Turn RT (2) over so that it is resting on side with handle assembly (3) installed.
5. Repeat this procedure for other handle assembly.

REMOVAL OF SIDE AND REAR COVER PANELS

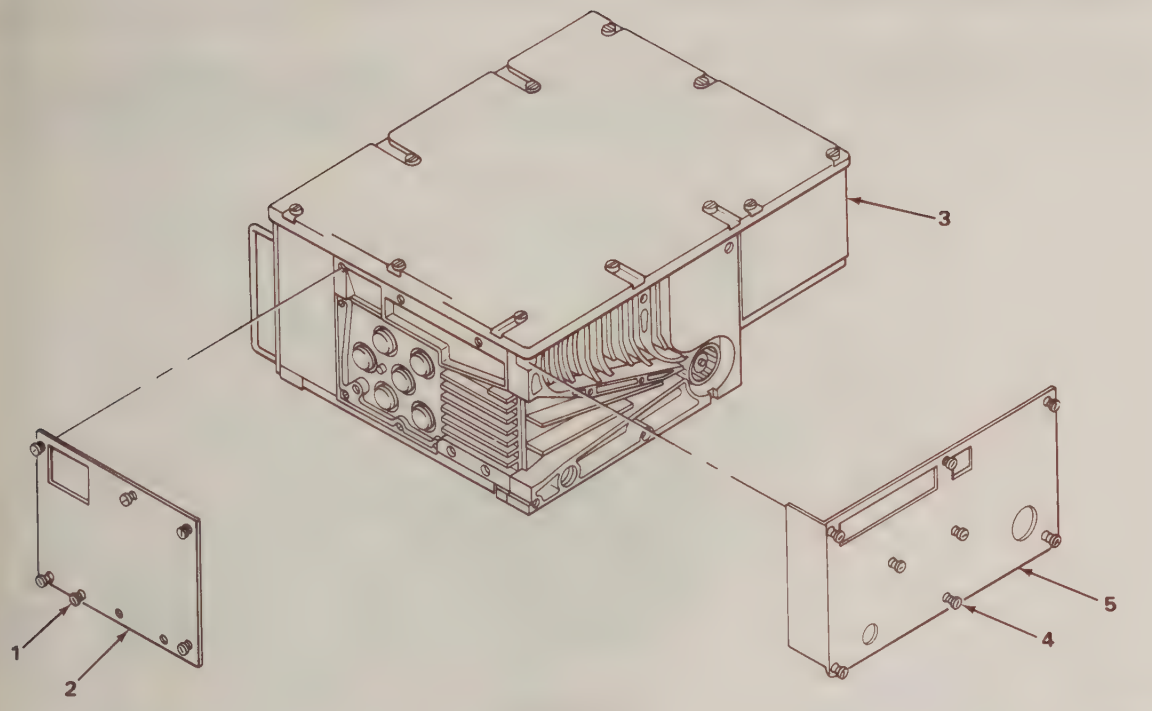
This procedure applies to the side and rear cover panels.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove RT from mounting and place on left side. (See page 3-141.)

CAUTION

Do not set RT on its rear panel. Damage to the RT blower could result.

RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)



EL8NZ088

CAUTION

Do not remove RT top and bottom cover. Dirt and other substances will damage internal parts.

1. Using screwdriver, loosen six captive screws (1) of side cover panel (2).
2. Remove side cover panel (2) from RT (3).
3. Using screwdriver, loosen eight captive screws (4) of rear cover panel (5).
4. Remove rear cover panel (5) from RT (3).

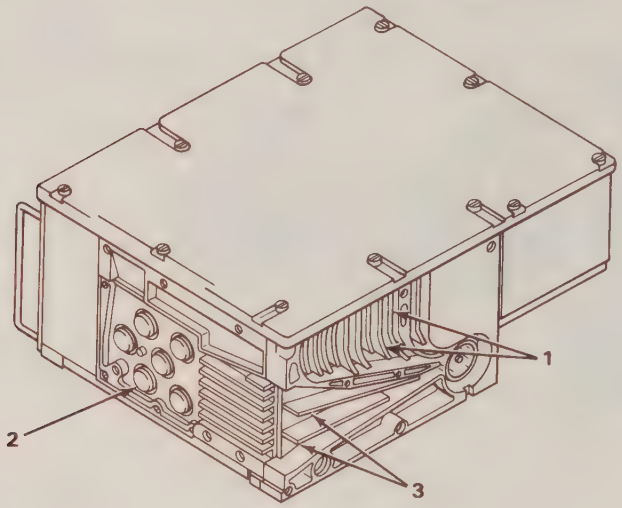
EPLACEMENT OF COVER PANELS

1. Put rear cover panel (5) on RT (3).
2. Using screwdriver, tighten eight captive screws (4).
3. Put side cover panel (2) in place.
4. Using screwdriver, tighten six captive screws (1).

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

REMOVAL OF DIRT FROM HEAT EXCHANGER AND BLOWER ASSEMBLY

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove RT from mounting and set on its left side. (See page 3-141.)
Remove side and back covers (page 3-143).



EL8NZ089

CAUTION

Do not remove top and/or bottom covers of RT. Dirt from cleaning the heat exchanger surfaces could get inside the radio. Do not use trichlorotrifluoroethane when cleaning RT. Damage to power transistor assembly will occur.

1. Using stiff-haired brush, loosen encrusted dirt from heat exchanger surfaces (1).
2. Using stiff-haired brush, loosen dirt from power transistor assembly surfaces (2).
3. Using soft-haired brush, remove dirt from heat exchanger surfaces (1).
4. Using soft-haired brush, remove dirt from power transistor assembly surfaces (2).
5. Using toothbrush, remove dirt from vanes and fins (3) of blower motor.

NOTE

For replacement of covers, see replacement of cover panels on page 3-143.

For replacement of RT, see paragraph 2-11.

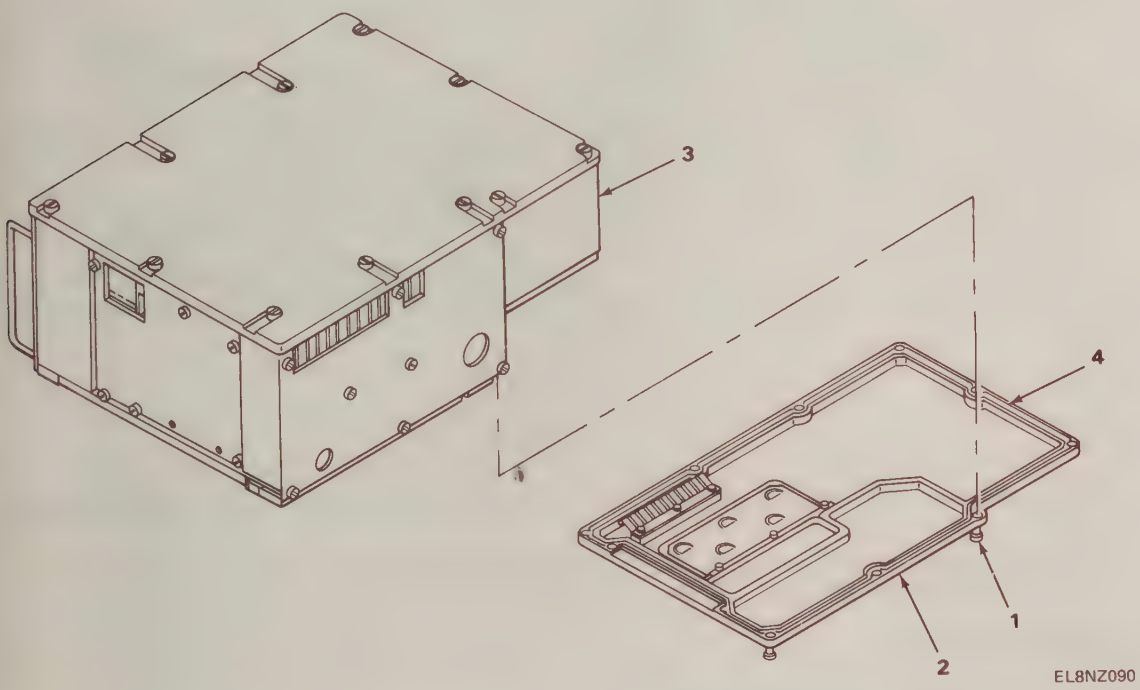
RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

EMOVAL OF BOTTOM COVER

OLS: Tool Kit, Electronic Equipment TK-101/G
TERIALS/PARTS: Silicone compound (item 1, appendix C)
ELIMINARY PROCEDURE: Remove RT from mounting. (See page 3-141.)

CAUTION

Do not set RT on its rear panel. Damage to the RT blower could result.



1. Using screwdriver, loosen 11 captive screws (1) from bottom cover (2).
2. Remove bottom cover (2) from RT (3).

EPLACEMENT OF BOTTOM COVER

NOTE

All radio components have a preformed gasket that requires lubrication before replacing the cover.

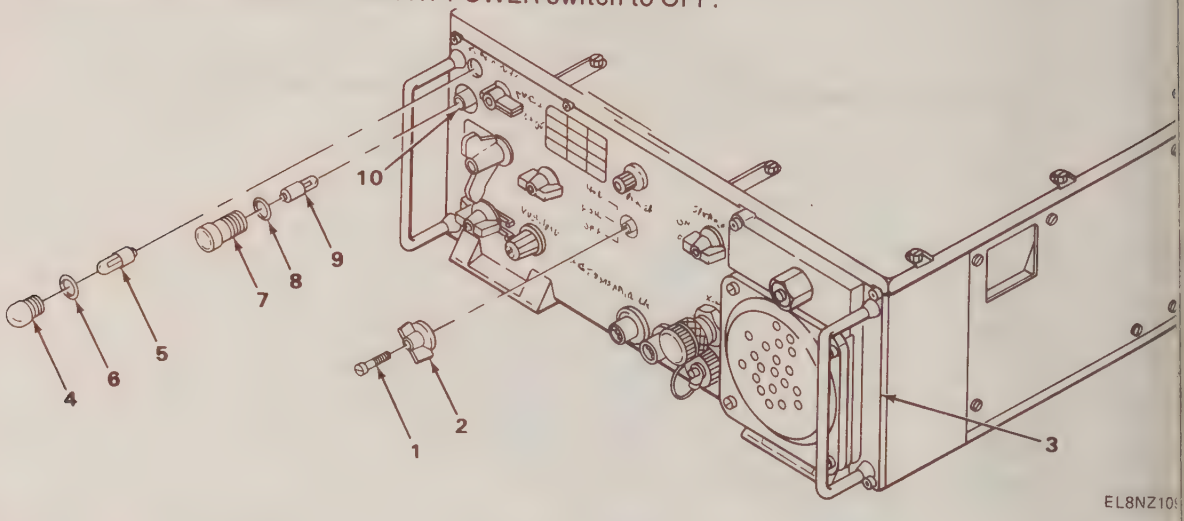
1. Apply thin coat of silicone compound (item 1, appendix C) to preformed gasket (4).
2. Put bottom cover (2) in place.
3. Using screwdriver, tighten 11 captive screws (1).

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

REPLACEMENT OF KNOBS, CALL LAMP AND DIAL WINDOW LAMP

Replacement procedures are the same for the RT-246, RT-246A, RT-524, and RT-524A.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT POWER switch to OFF.



EL8NZ10

Removal of Knobs

NOTE

Note position of indicator line on knob when removing. Replace new knob in the same position.

1. Using screwdriver, unscrew and remove screw (1) from knob (2).
2. Pull knob (2) from associated RT (3) control.

Replacement of Knobs

1. Push knob (2) on associated RT (3) control.
2. Using screwdriver, tighten screw (1).

Removal of Call Lamp

1. Unscrew and remove lens (4) with lamp (5) and O-ring (6) from call lamp fixture.
2. Pull lamp (5) from lens (4).

1. **RT-246(*)/VRC AND RT-524(*)/VRC.** (CONT)

eplacement of Call Lamp

NOTE

Check if O-ring is properly seated around lens.

. Push lamp (5) in lens (4).
. Screw lens (4) with lamp (5) and O-ring (6) into RT's call lamp fixture.

CAUTION

Do not overtighten lens.

eplacement of Dial Window Lamp

. Unscrew and remove lamp screw (7) and O-ring (8).
. Grasping flared end of lamp, pull lamp (9) from receptacle (10).

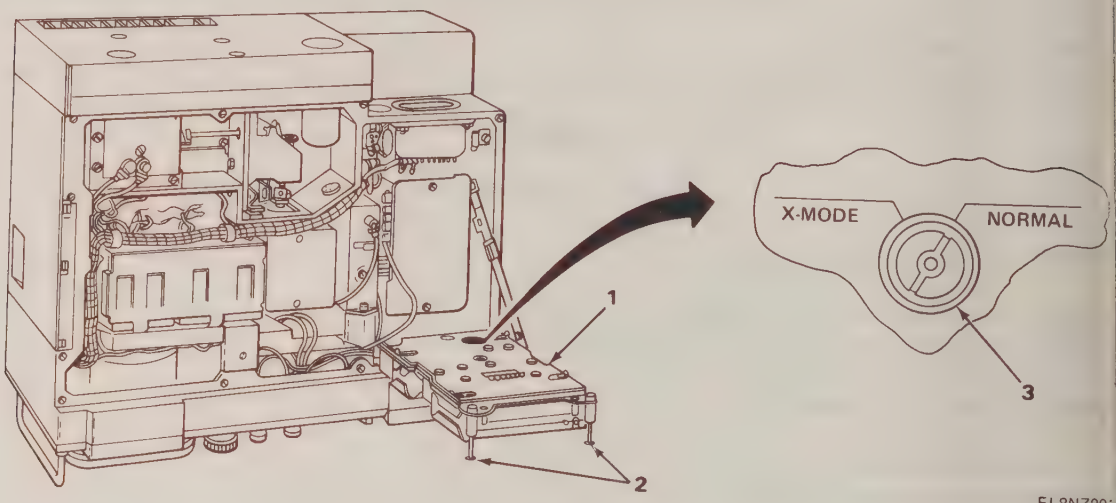
tallation of Dial Window Lamp

. Push lamp (9) (glass bulb in) into receptacle (10).
2. Screw lamp screw (7) into receptacle (10) on front of RT. Fingertighten.

3-16. RT-246(*)/VRC AND RT-524(*)/VRC. (CONT)

SETTING RT X-MODE/NORMAL SWITCH FOR SECURE COMMUNICATION

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove bottom cover. (See page 3-145.)



EL8NZ09

NOTE

For a test to determine the position of the X-MODE/NORMAL switch, see paragraph 2-16.

1. Using screwdriver, loosen two captive screws (1) on rear of A4000 assembly (2).
2. Raise A4000 assembly (2).
3. Set X-MODE/NORMAL switch (3) to X-MODE position.
4. Lower A4000 assembly (2).
5. Using screwdriver, tighten two captive screws (1).

CAUTION

Do not overtighten screws.

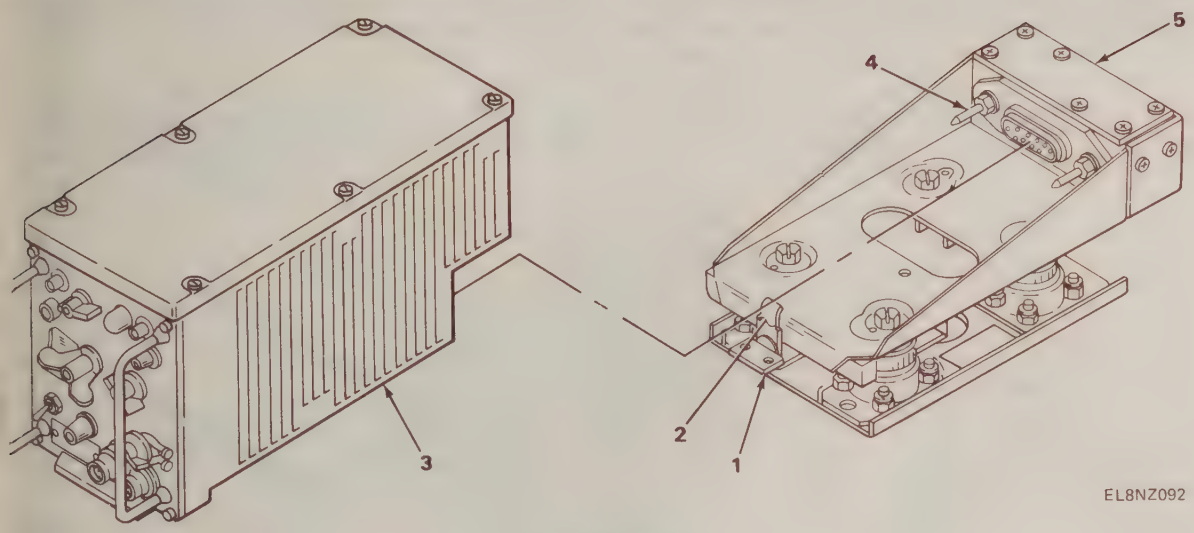
NOTE

For replacement of bottom cover, see page 3-145.

R-442 (*)/VRC.

REMOVAL OF R-442

PRELIMINARY PROCEDURE: Turn RT and R-442 POWER switch to OFF.



EL8NZ092

CAUTION

Use both guards to pull and then lift receiver to prevent equipment damage.

1. Unscrew thumbscrew (1) to lower clamp (2).
2. Pull receiver (3) forward until rear of receiver (3) is clear of guide pins (4).

CAUTION

Be careful to slide the R-442 straight into (or out of) the MT-1898/VRC. Damage to the radio jack (J14) can occur.

3. Lift receiver (3) from mounting (5).

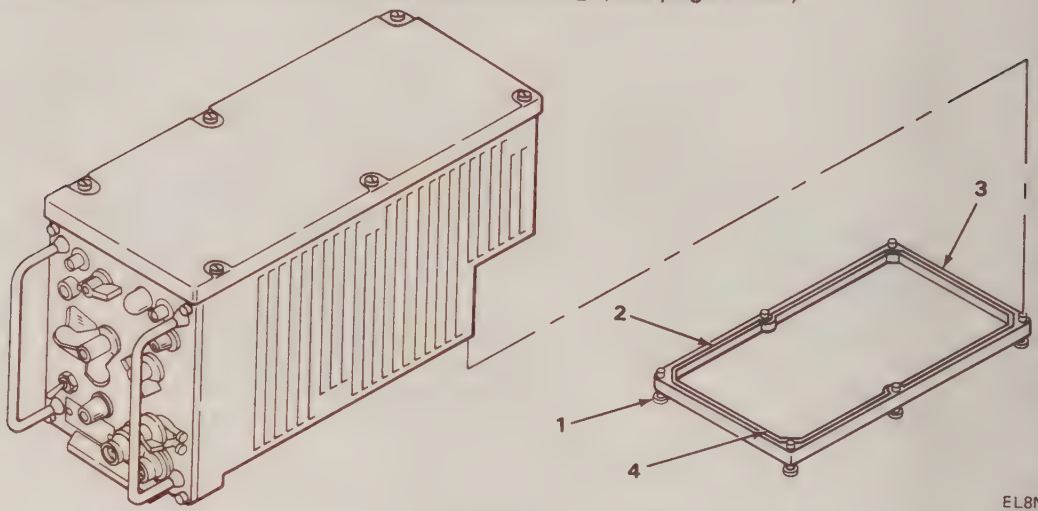
REPLACEMENT OF R-442

1. Place receiver (3) into mounting (5).
2. Aline receiver (3) with guide pins (4) and push back.
3. Screw thumbscrew (1) until clamp (2) tightens receiver (3) into mounting (5).

3-17. R-442 (*)/VRC. (CONT)

REMOVAL OF BOTTOM COVERS

TOOLS: Tool Kit, Electronic Equipment TK-101/G
MATERIALS/PARTS: Silicone Compound (item 1, appendix C)
PRELIMINARY PROCEDURE: Remove R-442 from mounting. (See page 3-149.)



CAUTION

Do not damage gasket (2) with screwdriver. If gasket is damaged, replace to insure water-proofing protection of junction box.

1. Using screwdriver, loosen six captive screws (1) of bottom cover (3).
2. Remove bottom cover (3).

INSTALLATION OF BOTTOM COVERS

NOTE

All radio components have a preformed gasket that requires lubrication before replacing the cover.

1. Apply thin coat of silicone compound (item 1, appendix C) to gasket (4).

CAUTION

Do not overtighten screws.

2. Put bottom cover (3) in place.
3. Using screwdriver, tighten six captive screws (1).

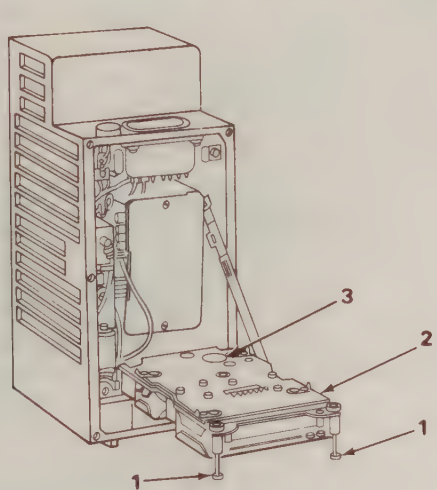
R-442 (*)/VRC. (CONT)

ETING OF X-MODE/NORMAL SWITCH

OLS: **Tool Kit, Electronic Equipment TK-101/G**
LIMINARY PROCEDURE: Remove bottom cover. (See page 3-150.)

NOTE

If the receiver is to be used with X-MODE equipment, the receiver is set up for X-MODE. If the receiver is not to be used with X-MODE equipment, the receiver is set up for NORMAL.



EL8NZ110

1. Using screwdriver, loosen two captive screws (1) on rear of A4000 assembly.
2. Raise A4000 assembly (2).
3. Set X-MODE/NORMAL switch (3) to desired position (X-MODE, (secured) or NORMAL, (nonsecured)).

CAUTION

Do not overtighten screws.

4. Lower A4000 assembly (2).
5. Using screwdriver, tighten two captive screws (1).

NOTE

To replace bottom cover, see page 3-150.

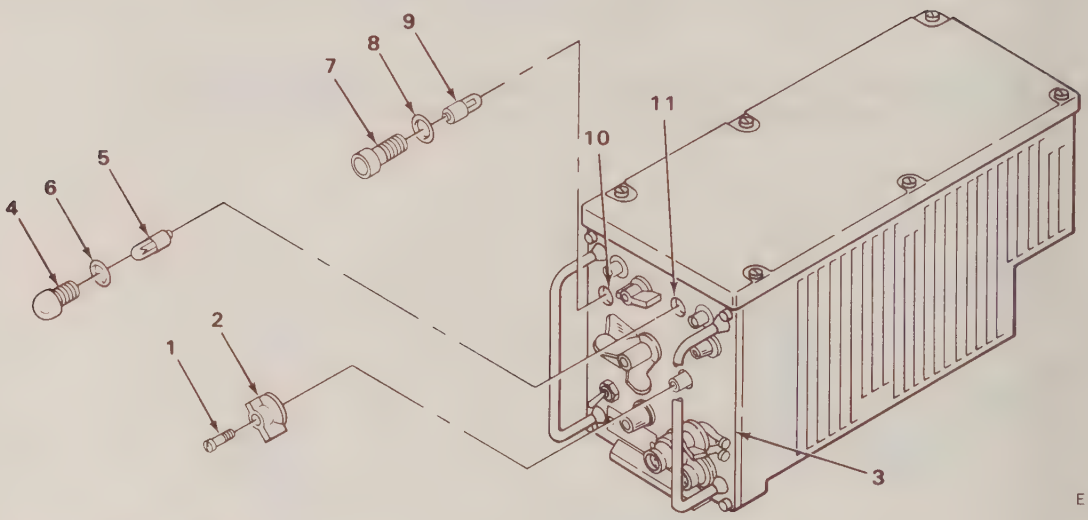
Tag the receiver if it has been set up for X-MODE.

3-17. R-442 (*)/VRC. (CONT)

REPLACEMENT OF KNOBS AND LAMPS

TOOLS: Tool Kit, Electronic Equipment TK-101/G

PRELIMINARY PROCEDURE: Turn R-442 POWER switch to OFF.



Removal of Knobs

NOTE

Note position of indicator line on knob when removing. Replace new knob in the same position.

1. Using screwdriver, unscrew screw (1) from knob (2).
2. Pull knob (2) from associated receiver (3) control.

Replacement of Knobs

1. Place knob (2) on associated receiver (3) control.
2. Using screwdriver, tighten screw (1).

Removal of Call Lamp

1. Unscrew and remove lens (4) with lamp (5) and O-ring (6) from R-442 call lamp fixture (11).
2. Pull lamp (5) from lens (4).

7. R-442 (*)/VRC. (CONT)

Replacement of Call Lamp

CAUTION

Do not overtighten lens.

1. Push lamp (5) in lens (4).
2. Screw in lens (4) with lamp (5) and O-ring (6) into R-442 (3) call lamp fixture. Fingertighten.

NOTE

Check that O-ring (6) is properly seated around lens.

Removal of Dial Window Lamp

1. Unscrew and remove lamp screw (7) and O-ring (8).
2. Grasping flared end of lamp, pull lamp (9) from receptacle (10).

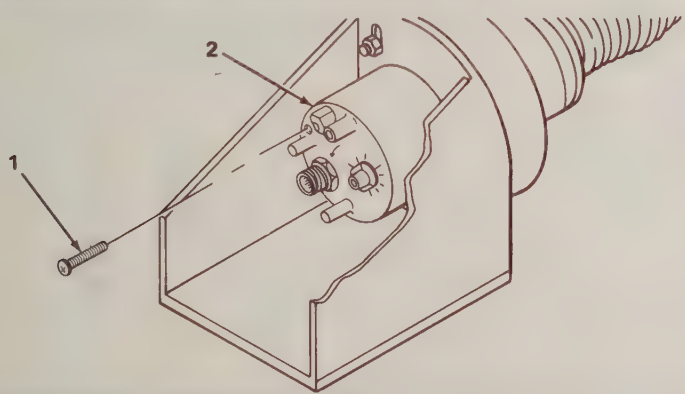
Replacement of Dial Window Lamp

1. Push lamp (9) (glass bulb) in receptacle (10).
2. Screw lamp screw (7) into receptacle (10) on front of receiver (3). Fingertighten.

18. ANTENNAS.

DRAINAGE OF WATER FROM MATCHING UNIT MX-6707

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT POWER switch to OFF.



EL8NZ164

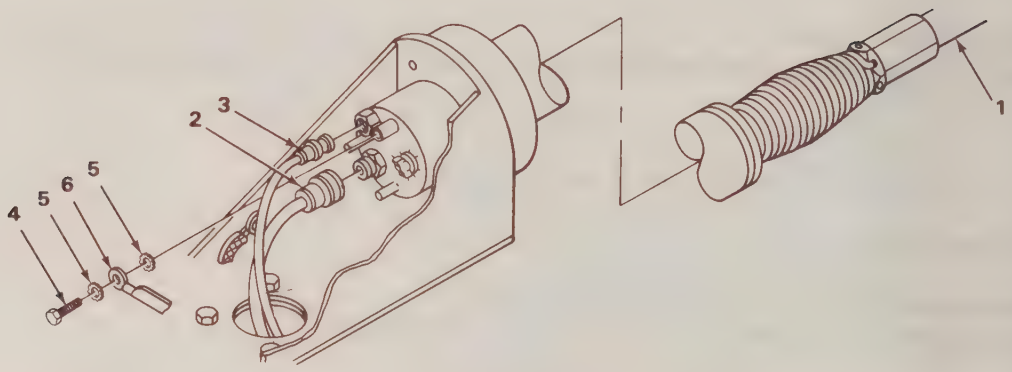
1. Using cross-tip screwdriver, remove seal screw (1) from matching unit (2).
2. Drain moisture. (Hold a rag under matching unit (2).)
3. Screw seal screw (1) into matching unit (2) and tighten using cross-tip screwdriver.

3-18. ANTENNAS. (CONT)

AS-1729/VRC

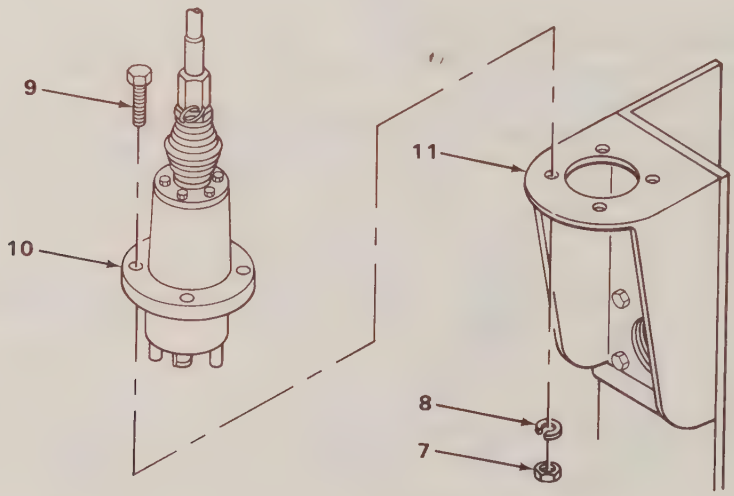
REMOVAL OF MATCHING UNIT MX-6707

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT POWER switch to OFF.



EL8NZ

1. Remove antenna elements (1). (See removal of antenna elements, page 3-155.)
2. Remove control cable (2) and rf cable (3).
3. Using 7/16-inch wrench, remove ground strap bolt (4).
4. Remove two star washers (5) and ground strap (6).



EL8NZ

5. Using 1/2-inch wrench, remove mounting nuts (7) and lockwashers (8) from four bolts (9).
6. Remove MX-6707 (10) from mounting bracket (11).

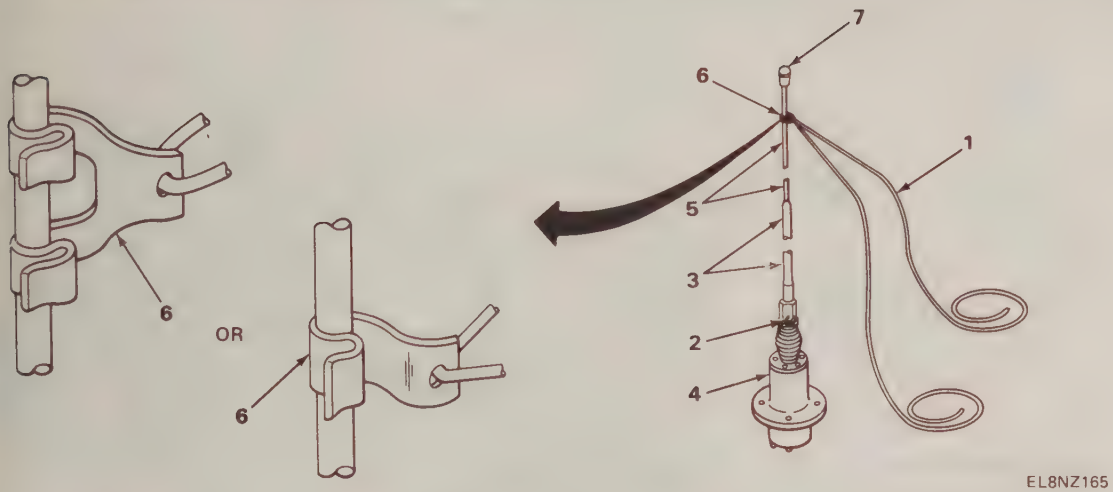
NOTE

For installation of elements, see paragraph 2-9.

ANTENNAS. (CONT)

emoval of Antenna Elements AS-1730 and AT-1095

OLS: Tool Kit, Electronic Equipment TK-101/G
ELIMINARY PROCEDURE: Turn RT POWER switch to OFF.



1. Untie tiedown ropes (1) from vehicle tiedown points.
2. Remove safety wire (2) from AS-1730 (3) and MX-6705 spring assembly (2).
3. Unscrew lower element (3) from matching unit spring assembly (2).
4. Unscrew upper element (5) from AS-1730 (3).
5. Remove tiedown assembly (6) and tip cap (7).

NOTE

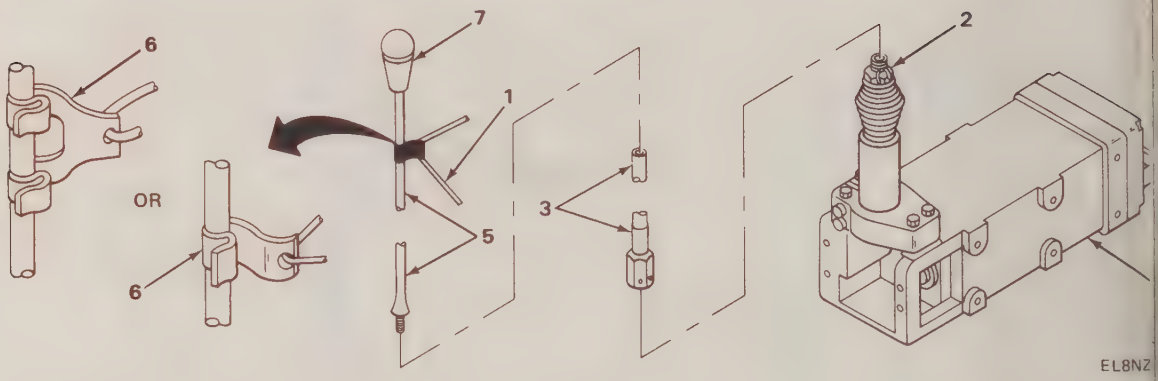
For installation of antenna elements, see paragraph 2-9.

3-18. ANTENNAS. (CONT)

AT-912/VRC

Removal of Antenna Elements AT-1095 and AT-1096

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT POWER switch to OFF.



1. Untie tiedown ropes (1) from vehicle tiedown points.
2. Remove safety wire (2) from AT-1096 (3) and AB-719 (2).
3. Unscrew lower element (3) from AB-719 (2).
4. Unscrew upper element (5) from lower element (3).
5. Remove tiedown assembly (6) and tip cap (7) from upper element (5).

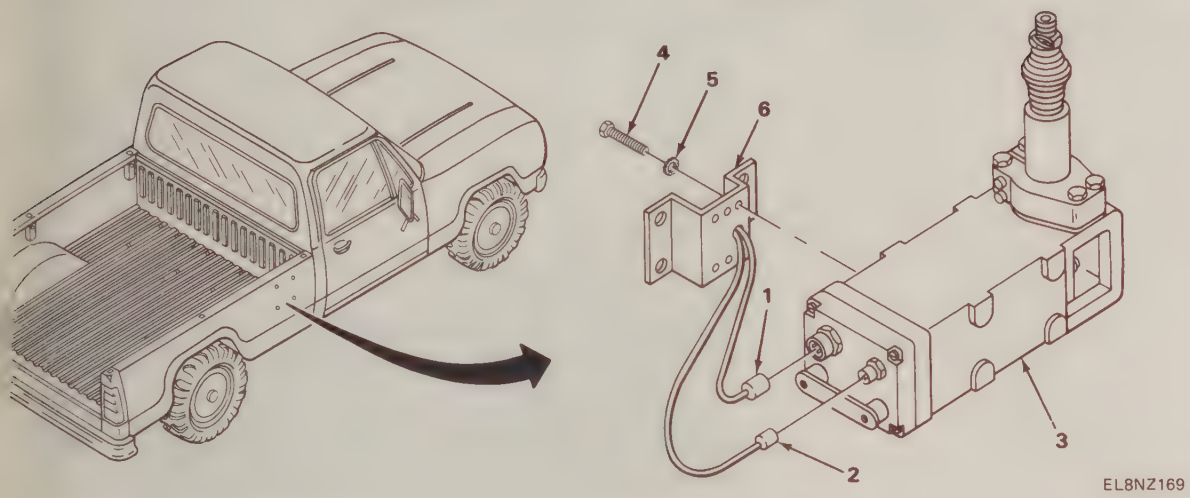
NOTE

For installation of antenna elements, see paragraph 2-9.

4. **ANTENNAS.** (CONT)

emoval of Matching Unit MX-2799

OLS: Tool Kit. Electronic Equipment TK-101/G
ELIMINARY PROCEDURE: Turn RT POWER switch to OFF.
Remove antenna elements. (See page 3-156.)



1. Remove control cable (1) and rf cable (2) from MX-2799 (3).
2. Using 7/16-inch wrench, unscrew and remove six mounting bolts (4) and star washers (5) from vehicle mounting bracket (6) while holding MX-2799 (3).
3. Remove matching unit from vehicle mounting bracket (6).

NOTE

For installation of MX-2799, see paragraph 2-9.

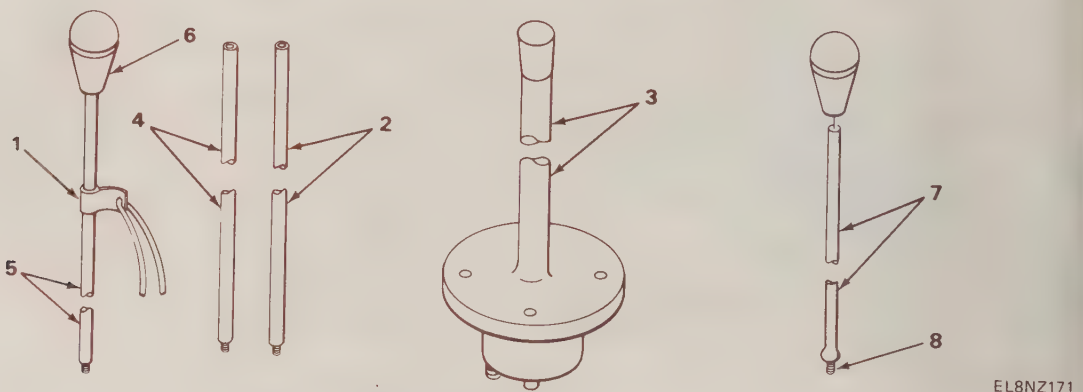
3-18. ANTENNAS. (CONT)

AUXILIARY RECEIVER ANTENNA

Removal of Antenna Elements MS-116, MS-117, and MS-118

MATERIALS/PARTS: Silicone compound (item 1, appendix C)
Antenna element AT-1095/VRC NSN 5820-00-856-2728

PRELIMINARY PROCEDURE: Turn RT and R-442 POWER switches to OFF.



EL8NZ171

NOTE

When one or more of the antenna elements (MS-116, MS-117 or MS-118) break, replace all the antenna elements with Antenna Element AT-1095/VRC.

1. Untie antenna tiedown assembly (1).
2. Unscrew bottom element (2) from antenna base (3).
3. Unscrew middle element (4) from bottom element (2).
4. Unscrew top element (5) from middle element (4).
5. Remove tip cap (6) and antenna tiedown (1) from top element.

Replacement of Antenna Elements MS-116, MS-117, and MS-118 with Antenna Element AT-1095/VRC

1. Apply thin coat of silicone compound (item 1, appendix C) to threads (8) of AT-1095/VRC (7).
2. Screw AT-1095/VRC (7) into antenna base (3).

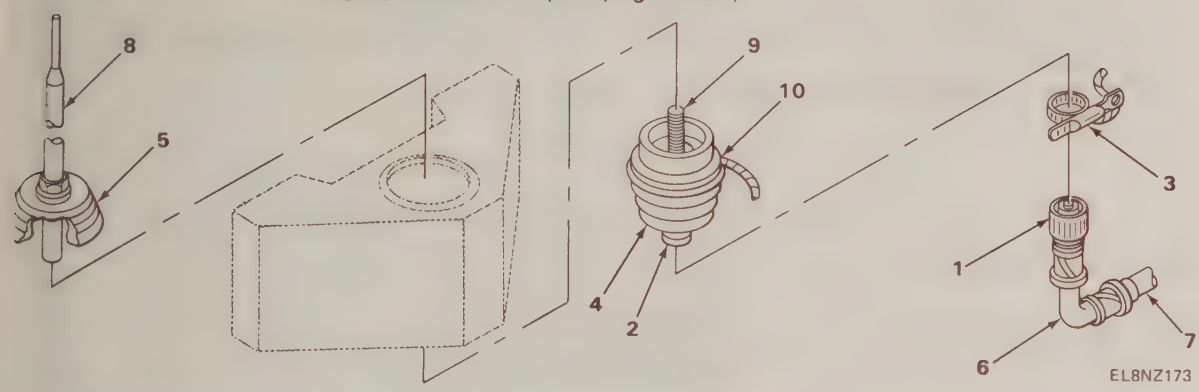
NOTE

For installation of Antenna Elements MS-116, MS-117, and MS-118, see paragraph 2-10.

ANTENNAS. (CONT)

REMOVAL OF BASE AB-15/GR

PRELIMINARY PROCEDURE: Turn receiver POWER switch to OFF.
Remove elements. (See page 3-158.)



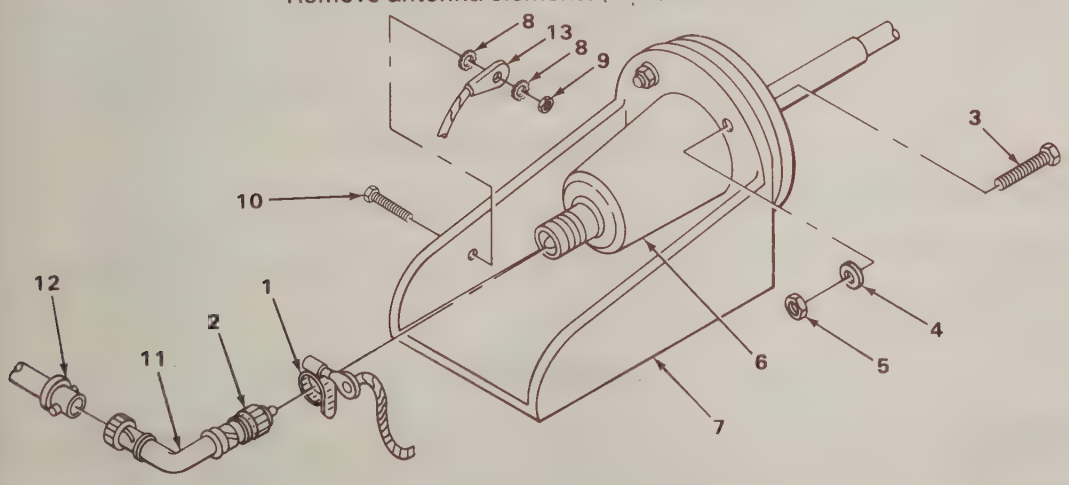
. Unplug rf cable (7) on Adaptor UG-306 (6) from Adaptor UG-273/U (1).
. Unscrew support (8) from lower insulator stud (9). Set upper insulator (5) and support (8) aside.
. Slide grounding ring (10) off lower insulator (4).
. Loosen grounding clamp (3) and slide it off Adaptor UG-273/U (1).
. Unscrew and remove Adaptor UG-273/U (1) from AB-15 jack (2).

NOTE

For installation, see paragraph 2-10.

REMOVAL OF AB-558/GR

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn RT switches to OFF.
Remove antenna elements (See page 3-185.)



1. Unplug rf cable (12) or Adaptor UG-306/U (11) (if used) from Adaptor UG-273/U (2).
2. Using 7/16-inch wrench, unscrew and remove ground strap nut (9), star washers (8), and ground strap lug (13) from grounding bolt (10).
3. Loosen grounding clamp (1) and slide it off Adaptor UG-273/U (2).

3-18. ANTENNAS. (CONT)

REMOVAL OF AB-558/GR (CONT)

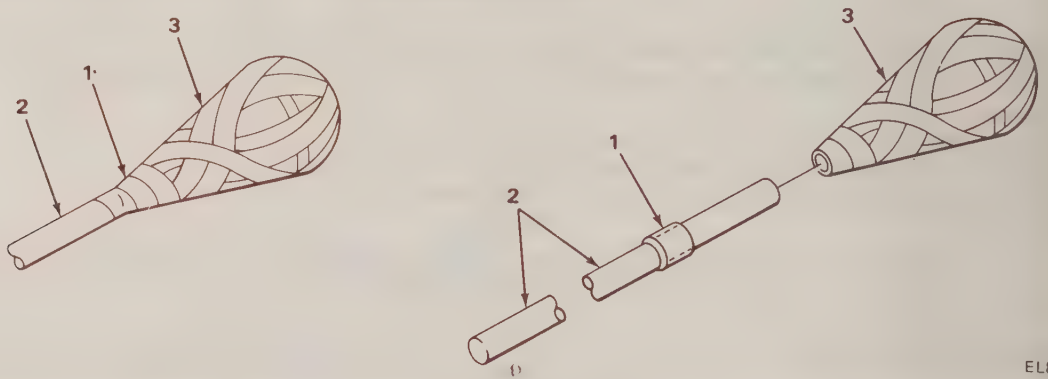
4. Unscrew and remove Adaptor UG-273/U (2) from the AB-558 (6) jack.
5. Using 1/2-inch wrench, unscrew and remove mounting nuts (5), and star washers (4) from four bolts (3).
6. Remove AB-558 (6) from vehicle's antenna bracket (7).

NOTE

For installation, see paragraph 2-10, page 2-32.

REMOVAL OF ANTENNA TIP CAP

TOOLS: Tool Kit TK-101/G
PRELIMINARY PROCEDURE: Turn RT POWER switch to OFF.



1. Using knife, cut tape (1) from around antenna element (2) which attaches tip cap (3) to antenna element (2).
2. Pull tip cap (3) from antenna element (2).
3. Cut remaining tape (1) from antenna element (2).

NOTE

For installation, see paragraph 2-10.

3-19. MT-1029/VRC AND MT-1898/VRC.

REMOVAL AND REPAIR OF TERMINAL BOARD

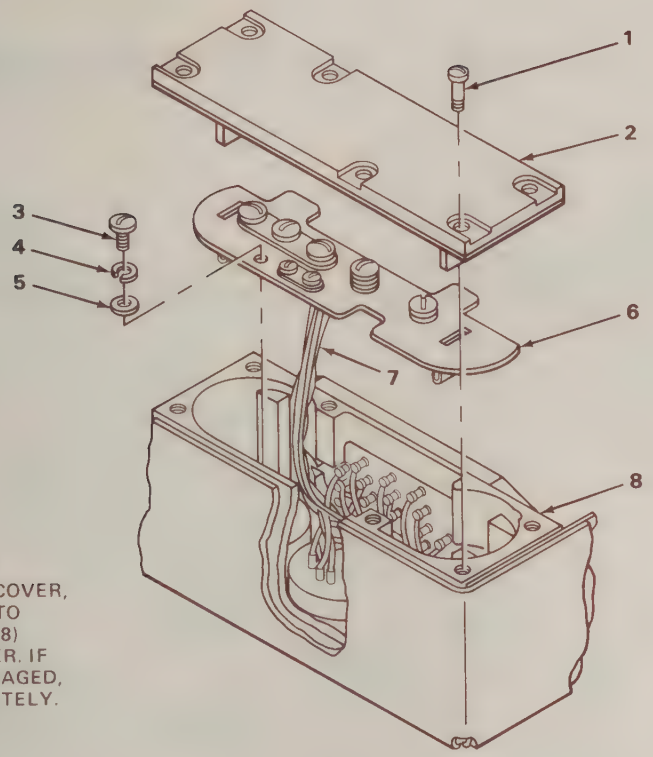
TOOLS: Tool Kit, Electronic Equipment TK-101/G

WARNING

Disconnect Power Cable CX-4720 from vehicle's batteries before removing a mount's J-box cover. **Extreme** electrical **hazards** exist within the J-box that could cause **death**.

PRELIMINARY PROCEDURE: Disconnect CX-4720 from vehicle battery.

9. **MT-1029/VRC AND MT-1898/VRC.** (CONT)



CAUTION

WHEN REMOVING COVER, BE CAREFUL NOT TO DAMAGE GASKET (8) WITH SCREWDRIVER. IF GASKET (8) IS DAMAGED, REPLACE IMMEDIATELY.

EL8NZ096

emoval

1. Using screwdriver, loosen six captive screws (1) and lift cover (2) off J-box (9).
2. Using screwdriver, unscrew and remove screw (3), lockwasher (4) and flat washer (5) from terminal board (6).
3. Insert screwdriver behind terminal board (6) and pry up from underneath.

CAUTION

Do not apply excessive pressure on terminal board (6).

4. Inspect wires (7) and their connections. Solder if needed.

NOTE

Solder connections in accordance with TB-SIG-222.

Replacement

1. Insert tabs of terminal board (6) between slots inside front of J-box (9).
2. Insert screw (3), lockwasher (4) and flat washer (5) through terminal board (6) and tighten.
3. Place cover (2) into position.
4. Using screwdriver, tighten six captive screws (1).

CAUTION

For older models, insure fuse lugs are lined up with terminal board holes while replacing cover.

3-19. MT-1029/VRC AND MT-1898/VRC. (CONT)

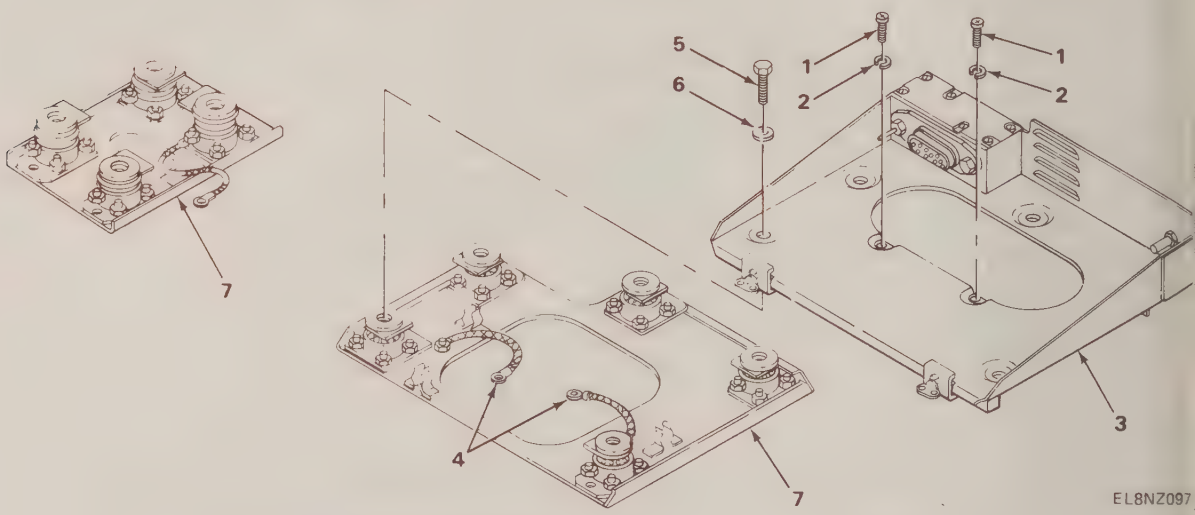
REMOVAL OF TOP TRAY

This procedure applies for both the MT-1029/VRC and the MT-1898/VRC. (The procedure for the MT-1029/VRC is shown.)

NOTE

The MT-1029/VRC has five mounting screws; the MT-1898/VRC has four mounting screws.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove RT or aux receiver from mounting. (See paragraphs 3-16 or 3-17.)



NOTE

Some MT-1029 mountings have two ground straps. If your MT-1029 has two, remove both.

1. Using screwdriver, unscrew screw (1) and lockwasher (2) from top tray (3).
2. Remove ground strap (4) from top tray (3).
3. Using 1/2-inch wrench, unscrew and remove five bolts (5) and five flat washers (6).
4. Remove top tray (3) from its base (7).

REPLACEMENT OF TOP TRAY

NOTE

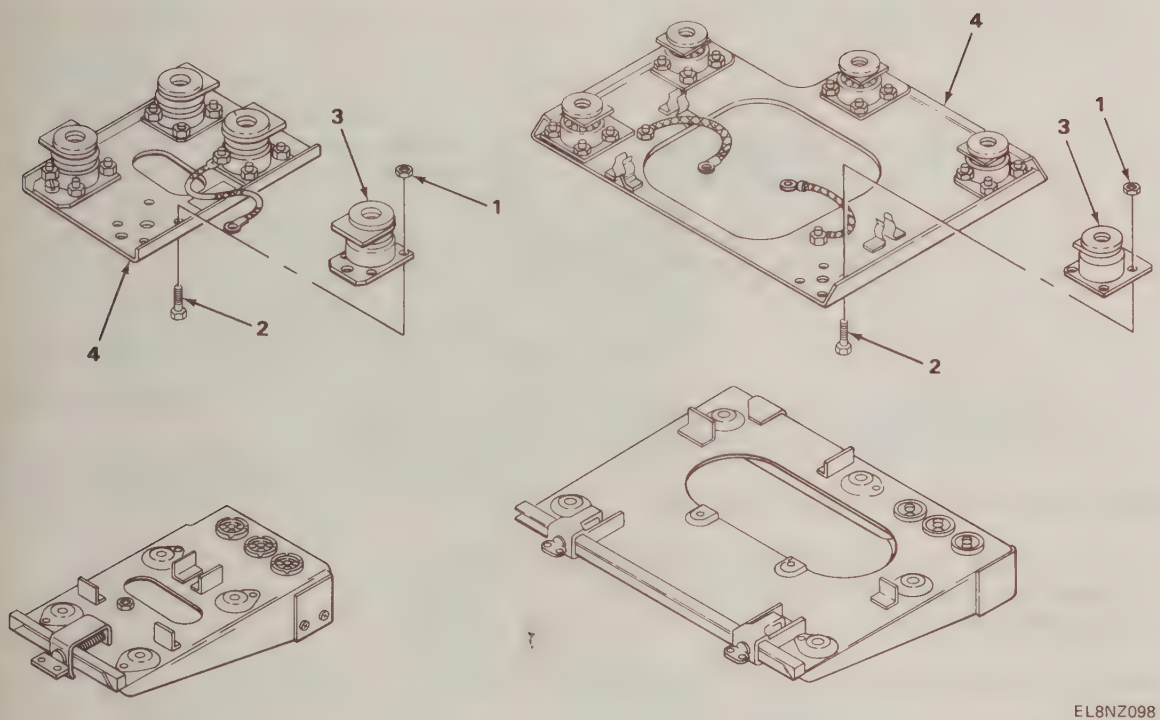
Isolator assembly caps must be positioned as shown.

1. Put top tray (3) in place on base assembly (7).
2. Using 1/2-inch wrench, secure five bolts (5) and flat washers (6). Tighten until snug.
3. Using screwdriver, secure ground strap (4), star washer (2) and screw (1).
4. Replace RT or receiver in mounting. (See paragraph 2-11 for RT and paragraph 2-14 for receiver.)

9. MT-1029/VRC AND MT-1898/VRC. (CONT)

REMOVAL OF SHOCK ABSORBERS

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Remove top tray. (See page 3-162.)



EL8NZ098

1. Hold nuts (1) with wrench and unscrew four screws (2) with screwdriver. tip screwdriver.
2. Remove shock absorber (3) from base assembly (4).
3. Repeat steps 1 and 2 for all shock absorbers (3).

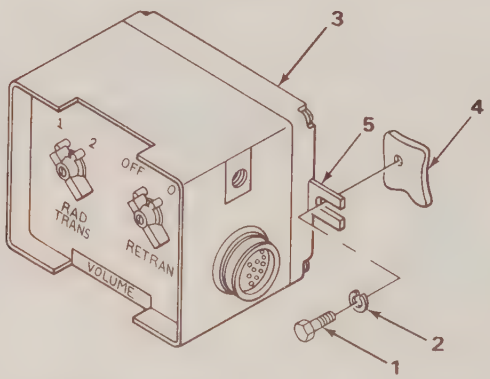
REPLACEMENT OF SHOCK ABSORBER

1. Aline mounting holes on shock absorter (3) and base assembly (4).
2. Insert four screws (2) through bottom of base assembly (4).
3. Place nuts (1) onto screws (2).
4. Hold nuts (1) with wrench and tighten screws (2).
5. Repeat steps 1 through 4 for all shock absorbers (3).
6. Replace top tray. (See page 3-162.)

3-20. RADIO RELAY BOX C-2299/VRC.

REMOVAL OF CONTROL BOX C-2299

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.



EL8NZ140

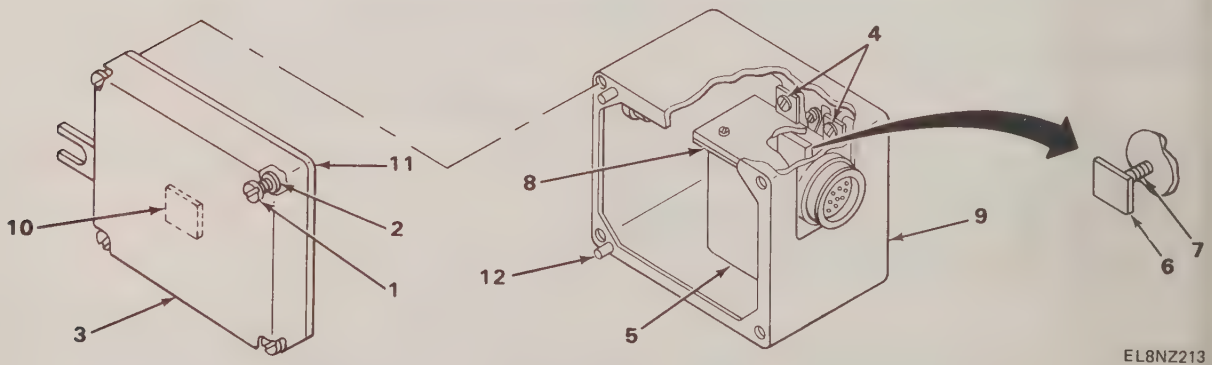
1. Using wrench, loosen and remove two bolts (1) and lockwashers (2).
2. Remove C-2299 (3) from mounting surface.

REPLACEMENT OF CONTROL BOX C-2299

1. Aline mounting lugs (5) with hole in mounting surface (4).
2. Insert two bolts (1) through lockwashers (2).
3. Tighten with wrench.

REMOVAL OF MICROPHONE AMPLIFIER MODULE A80

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.
Remove unit from mounting area. (See removal of C-2299 above.)



EL8NZ213

1. Unscrew four captive screws (1) and lockwashers (2).
2. Remove cover (3).
3. Loosen two captive screws (4) which retain bracket so that A80 assembly (5) can be lifted to clear the back of the box (9).

0. RADIO RELAY BOX C-2299/VRC. (CONT)

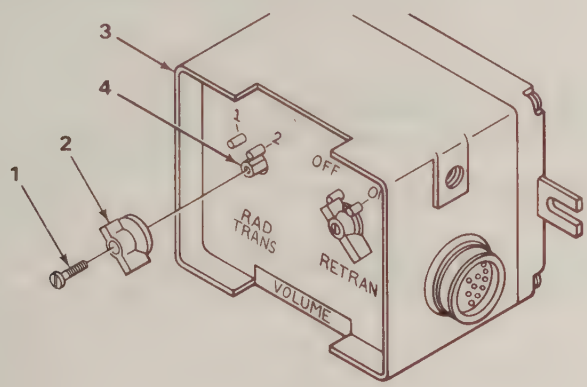
4. Carefully remove A80 amplifier assembly (5).

EPLACEMENT OF MICROPHONE AMPLIFIER MODULE A80

1. Check to see if rubber pad (6) is glued to stud (7) inside box (9) behind A80 assembly. If not, put in place.
2. Position A80 assembly (5) so that its pins aline with pins of jack (8).
3. Press A80 assembly (5) into place.
4. Hold A80 bracket in position and tighten two captive bracket-retaining screws (4).
5. Check to see if rubber pad (10) and preformed packing (11) are attached to rear cover (3). If not, put in place.
6. Apply a light coating of silicon compound (item 1, appendix C) to the preformed packing (11). Position cover (3) so its holes aline with guide pins (12) and press into place.
7. Tighten four captive screws (1).
8. Replace control box (9). (See page 3-164.)
9. Connect cables. (See cabling diagram, paragraph 2-13.)

EMOVAL OF KNOB

OOLS: Tool Kit, Electronic Equipment TK-101/G
RELIMINARY PROCEDURE: Turn power to OFF.



EL8NZ142

NOTE

Note the position of the knob before removal.

1. Using screwdriver, loosen and remove screw (1) from knob (2).
2. Pull knob (2) from C-2299 (3).

EPLACEMENT OF KNOB

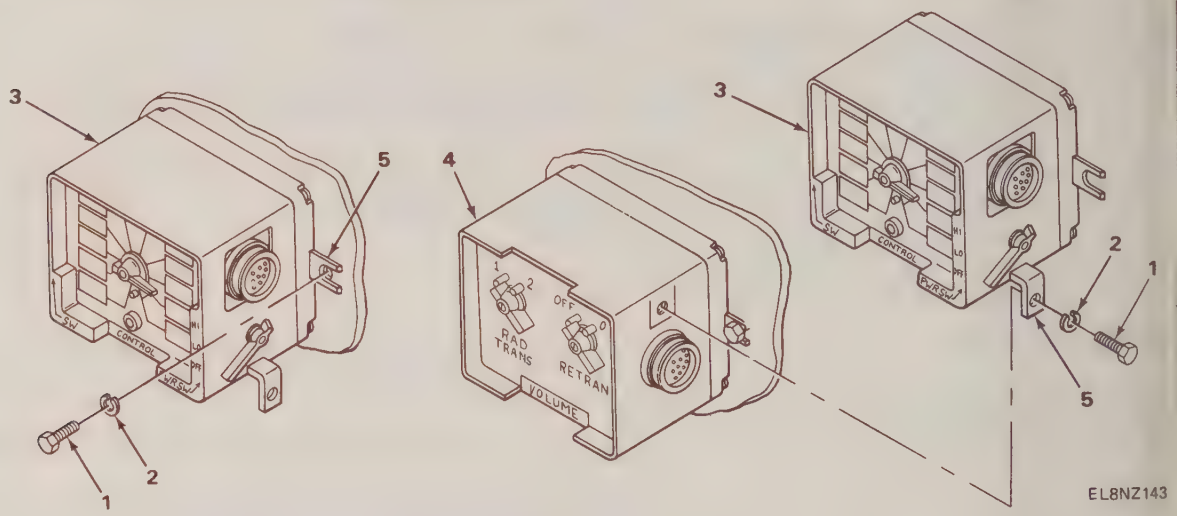
1. Place knob (2) on shaft (4) in same position noted.
2. Insert screw (1) through knob (2).
3. Tighten with screwdriver.

3-21. REMOTE CONTROL BOX C-2742/VRC.

REMOVAL OF REMOTE CONTROL BOX C-2742/VRC (FROM MOUNTING SURFACE)

Control Box C-2742 is mounted two ways. It can be mounted on a control box or on a flat surface.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.
Disconnect cables.



1. Using wrench, remove two bolts (1) and lockwashers (2).
2. Remove C-2742 (3) from mounting surface or C-2299 (4).

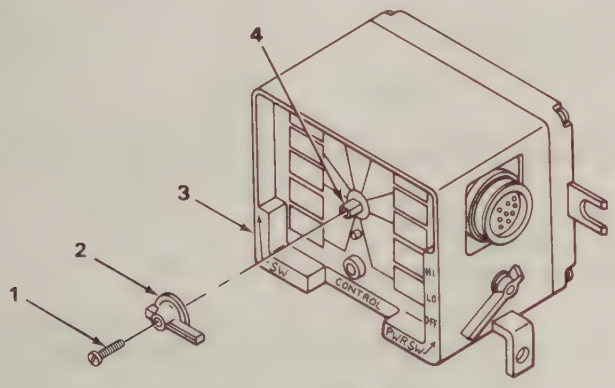
REPLACEMENT OF REMOTE CONTROL BOX C-2742/VRC

1. Aline mounting lug holes (5) in mounting surface or C-2299 (4).
2. Insert two bolts (1) and lockwashers (2).
3. Tighten with wrench.

1. **REMOTE CONTROL BOX C-2742/VRC.** (CONT)

REMOVAL OF KNOB

TOOLS: Tool Kit, Electronic Equipment TK-101/G
PRELIMINARY PROCEDURE: Turn power to OFF.



EL8NZ144

NOTE

Note the position of the knob before removal.

1. Using screwdriver, loosen and remove screw (1) from knob (2).
2. Pull knob (2) from C-2742 (3).

REPLACEMENT OF KNOB

1. Place knob (2) on shaft (4) in same position noted.
2. Insert screw (1) through knob (2).
3. Tighten with screwdriver.

3-22. CABLES.

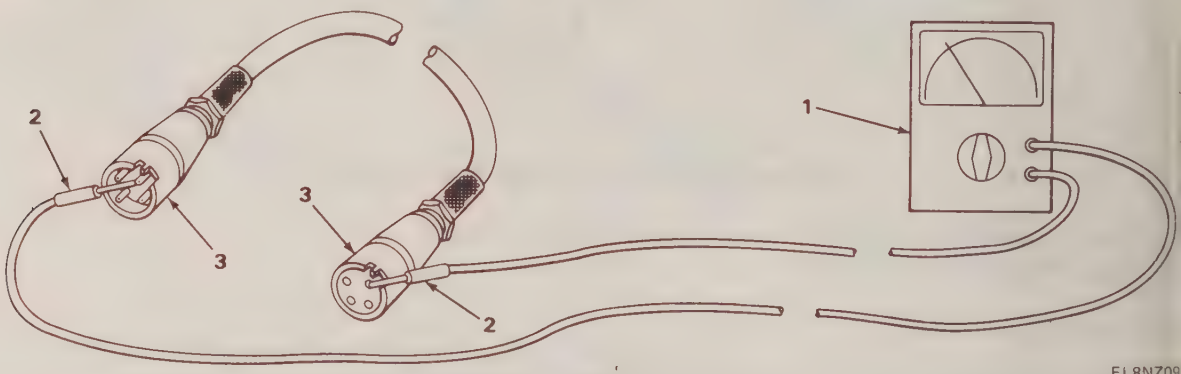
Cables are to be tested if troubleshooting finds a problem with them. Cable repair is limited to testing, resoldering of wires separated from plug terminals, and the replacement of plugs. If it is established during testing that your cable has a wire with a short or a break in the middle of it, the cable should be replaced.

TESTING FOR CONTINUITY (ADVERSE OPENS)

NOTE

If troubleshooting has indicated a certain pin connection is faulty, test that pin first.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
Multimeter AN/USM-223 or equivalent
PRELIMINARY PROCEDURE: Remove cable from unit.



EL8NZ09

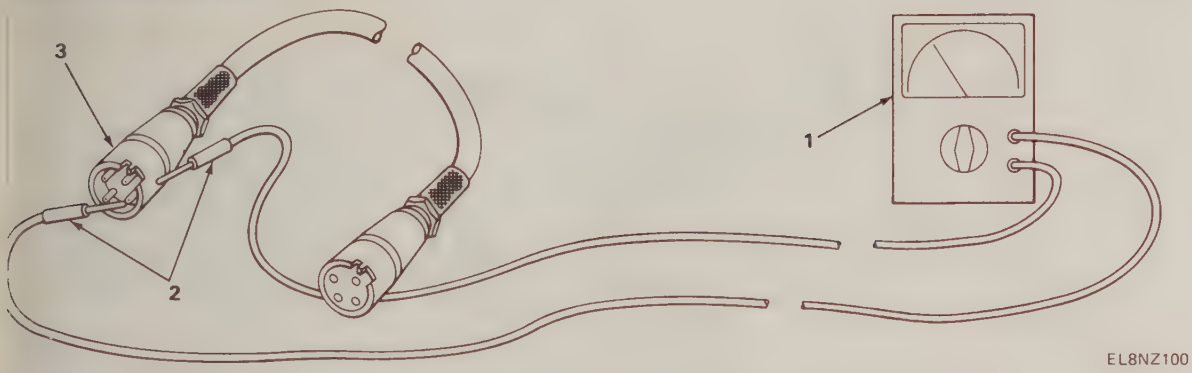
1. Set multimeter (1) to Rx1.
2. Connect two leads (2) together and zero the multimeter (1).
3. Separate test leads (2).
4. Connect a test lead (2) to pin of plug (3) to be tested.
5. Connect other test lead (2) to corresponding pin of other plug (3). (See cable schematics for wiring of cables and plugs.)
6. Multimeter (1) should read zero ohms.

NOTE

If the multimeter (1) does not read zero ohms, check plug for bad pins or loose pin connections.

2. **CABLES.** (CONT)

TESTING FOR ADVERSE SHORTS



EL8NZ100

1. Set multimeter (1) to Rx1.
2. Connect two test leads (2) together and zero the multimeter (1).
3. Separate test leads (2).
4. Connect a test lead (2) to pin of plug (3) to be tested.
5. Connect a test lead (2), one at a time, to each pin of the plug and the outer casing or ground pin of the plug (3). (See cable schematics for wiring of cables and plugs.)
6. Multimeter should read infinity (∞).

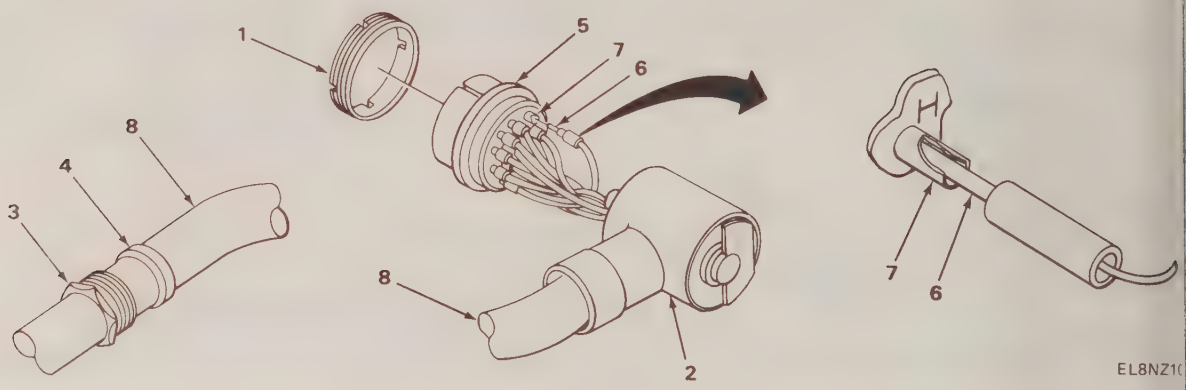
NOTE

If the multimeter (1) does not read ∞, check plugs for shorted pins.

Pin A is standard ground of most cable plugs in the system.

3-22. **CABLES.** (CONT)

REPAIR OF CABLES



1. Using spanner wrench, remove locknut (1) from plug housing (2).
2. Using wrench, loosen gland nut (3) and slide gland nut (3) and rubber gland (4) along cable (8).
3. Pull plug (5) from plug housing (2) while pushing cable (8) into housing (2).
4. Check for loose or broken wire connections.

NOTE

Check for shorting between adjacent pins, using ohmmeter.

5. Resolder any wire (6) that is disconnected from its pin (7).

NOTE

Refer to wiring diagrams as listed on page 3-171 for details covering wire connections and proper color coding.

Before soldering or resoldering, be familiar with TB-SIG-222.

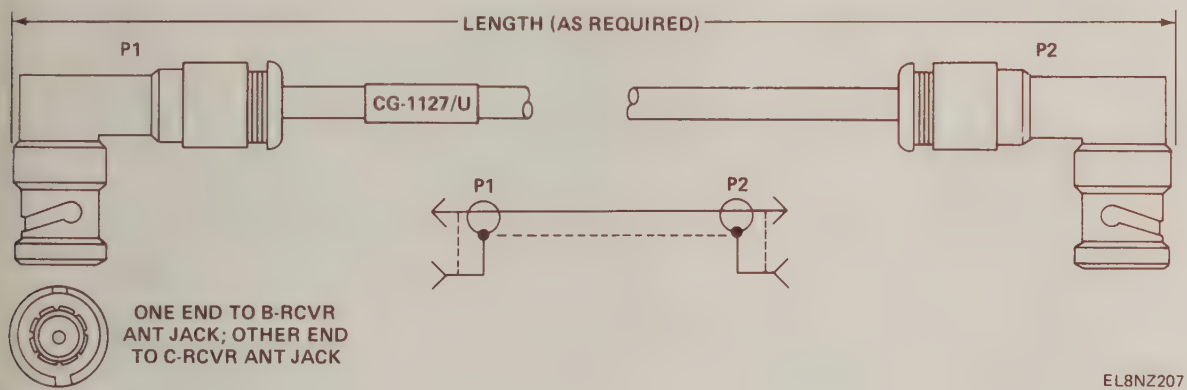
6. Test for continuity again. (See page 3-168.)
7. Push plug (5) into plug housing (2) while pulling gently on cable (8).
8. Using spanner wrench, install locknut (1) into plug housing (2).
9. Pull cable (8) to eliminate slack in plug housing (2).
10. Insert gland (4) into plug housing (2).
11. Install gland nut (5) into plug housing and tighten with wrench.

-2. **CABLES.** (CONT)

BLE SCHEMATICS

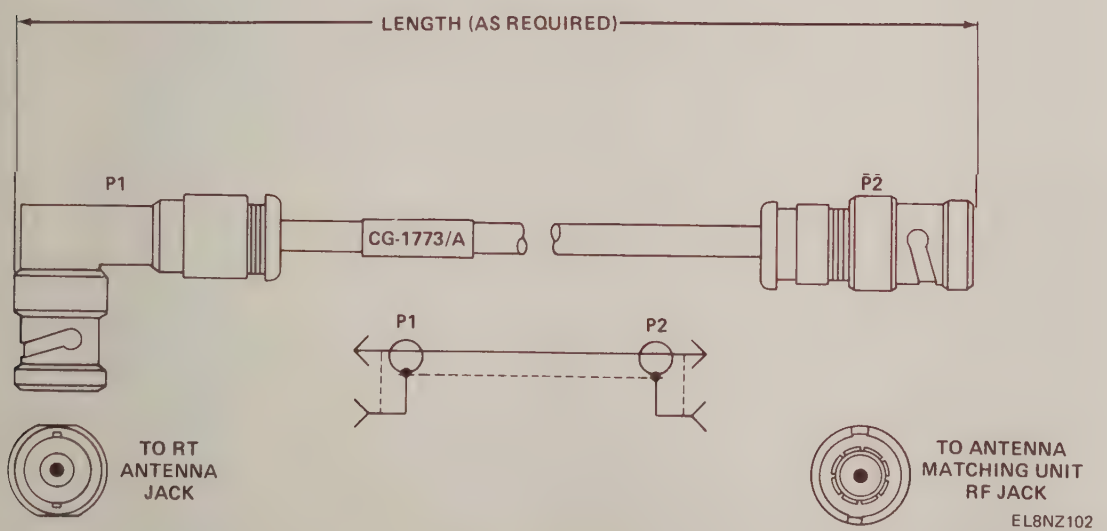
Cable	Page
-1127/U	3-171
-1773,A,B/U	3-171
-4720/VRC	3-172
-4721/VRC	3-173
-4722/VRC	3-174
-4723/VRC	3-175
K-7059/VRC	3-176

-1127/U



EL8NZ207

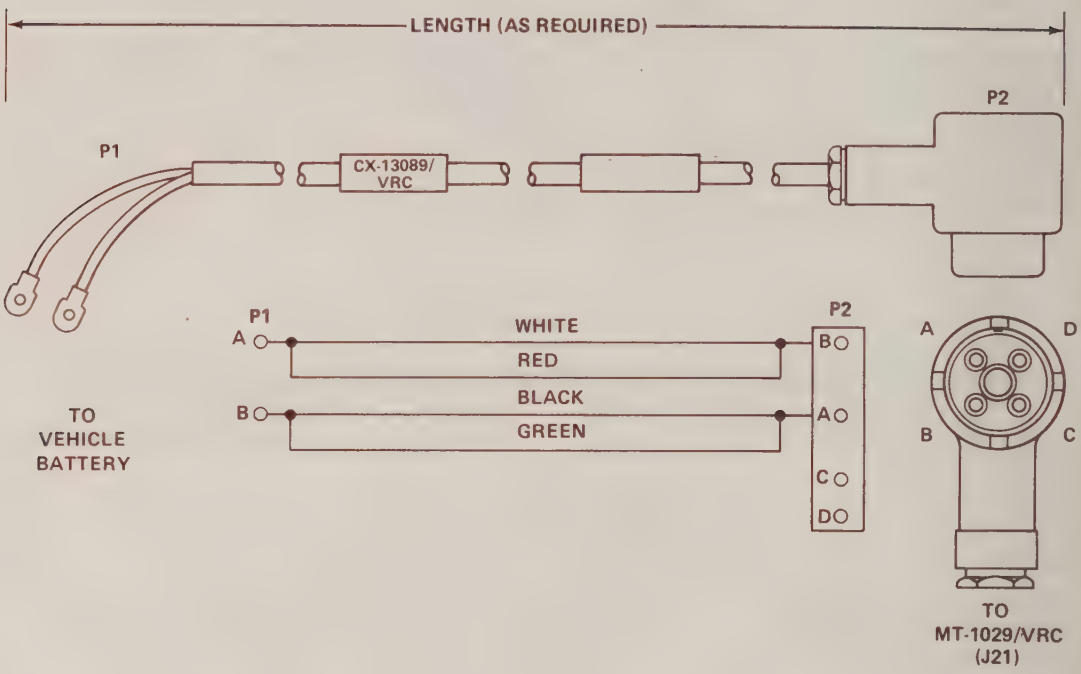
-1773A, B/U



EL8NZ102

3-22. CABLES. (CONT)

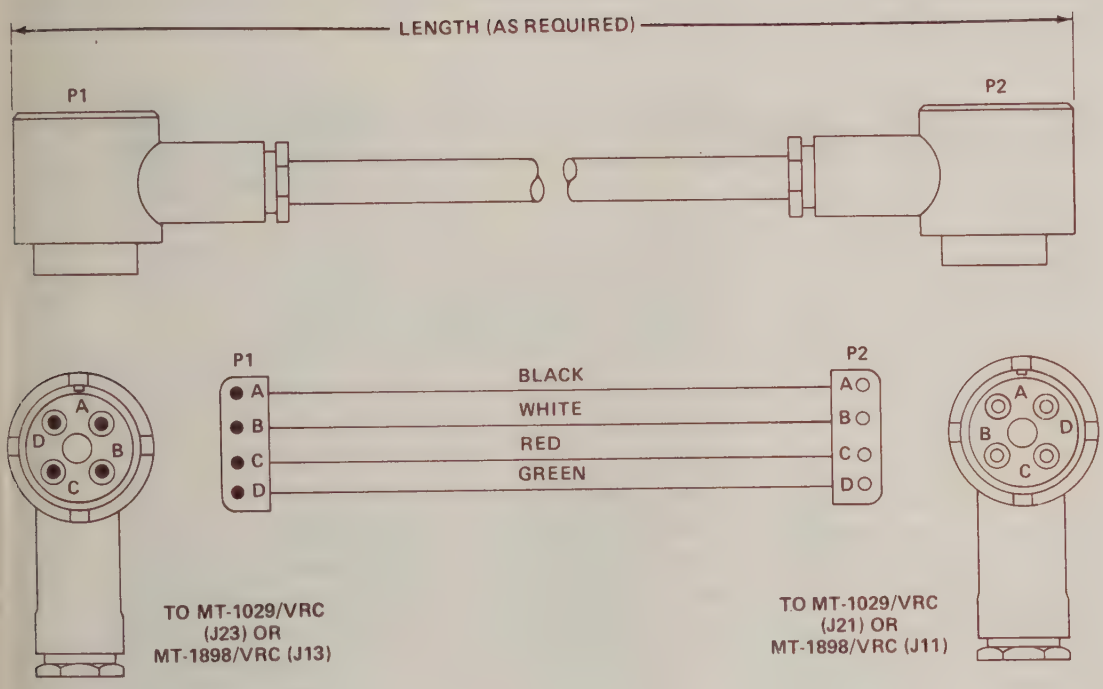
CX-4720/VRC



EL8NZ114

2. **CABLES.** (CONT)

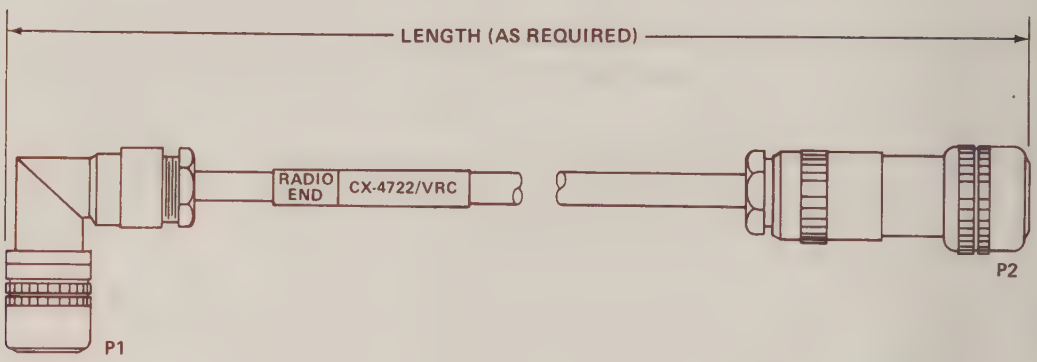
4721/VRC

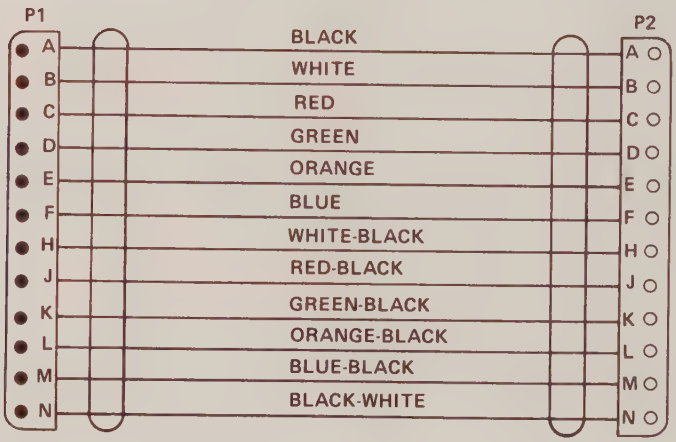


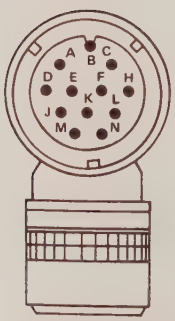
EL8NZ103

3-22. CABLES. (CONT)

CX-4722/VRC







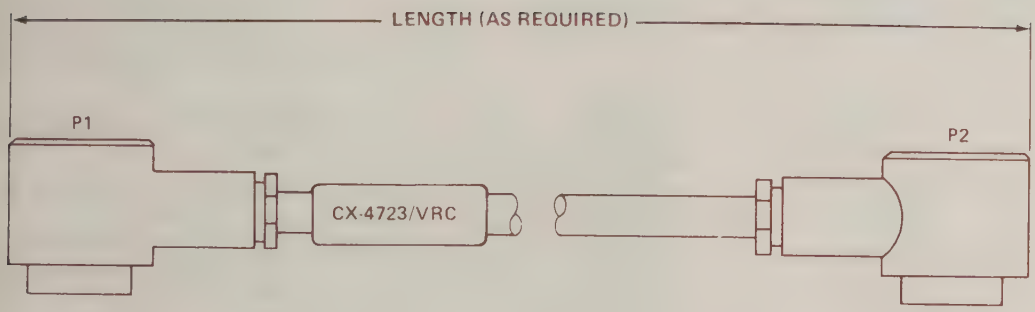
TO RT ANT
CONT JACK

TO ANTENNA
MATCHING UNIT
CONTROL JACK OR
CX 13055 OR
CX 13089 MALE PIN PLUG

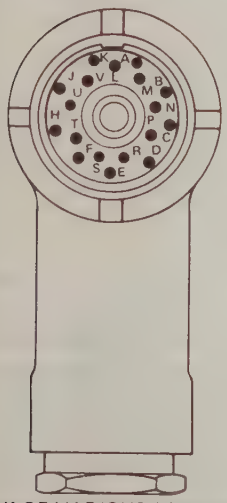
EL8NZ104

2. CABLES. (CONT)

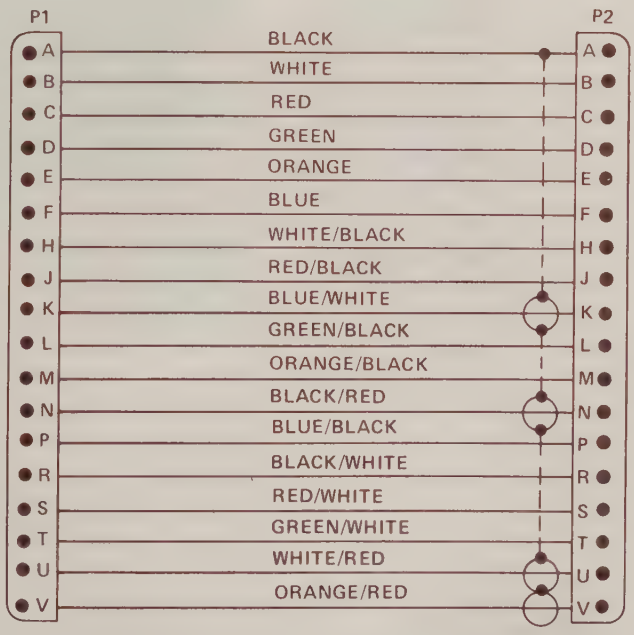
CX-4723/VRC



P1 AND P2



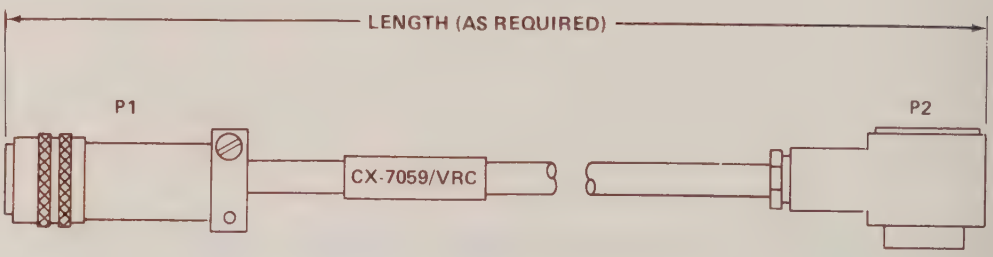
TO JACK OF VARIOUS COMPONENTS
EG, MT-1029(J22), MT-1898(J12)
C-2297(J904), C-2298, C-10456
C-10680 (J801 OR J804),
C-2299 (J701 OR J702),
C-2742 (J71 OR J72)

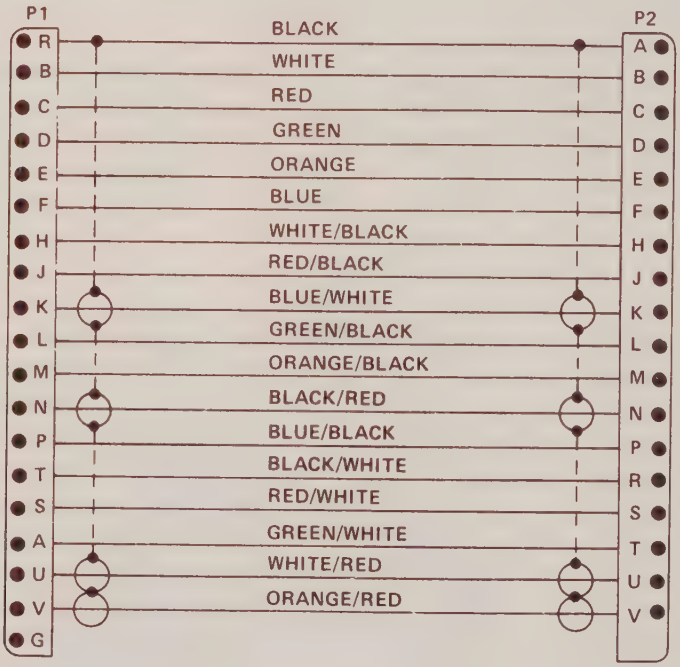


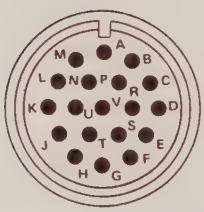
EL8NZ111

3-22. CABLES. (CONT)

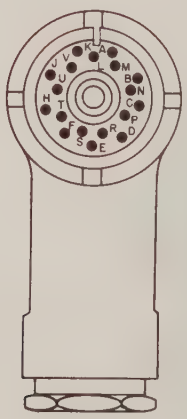
CX-7059/VRC







TO
RT-246(*)/VRC
REMOTE JACK



TO
C-2742/VRC
(J71)

EL8NZ211

Section V PREPARATION FOR STORAGE OR SHIPMENT

Subject	Para	Page
General	3-23	3-176
Administrative Storage	3-24	3-176
Intermediate Storage	3-25	3-177
Portable Storage	3-26	3-177

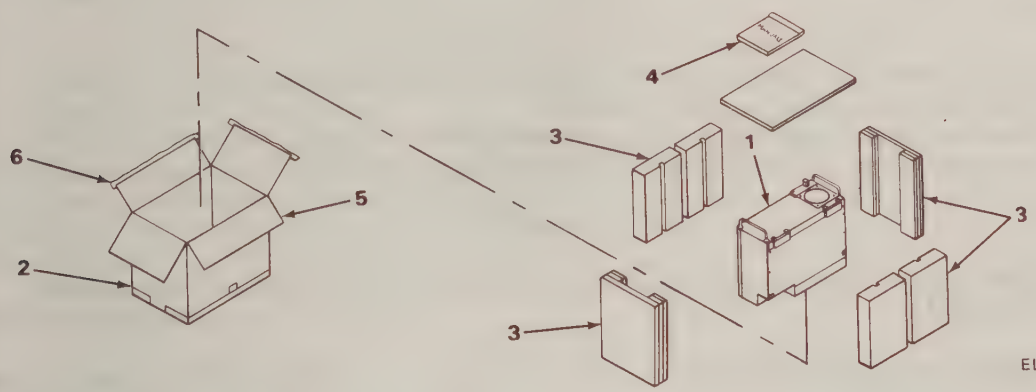
3-23. GENERAL.

This section provides procedures for repacking components of the AN/VRC-12 radio sets. Before repacking, the next scheduled PMCS should be performed, all known problems corrected, and all current Modification Work Orders (MWO's) applied.

3-24. ADMINISTRATIVE STORAGE.

Administrative storage refers to storage from 1 to 45 days.

TOOLS: Tool Kit, Electronic Equipment TK-101/G
MATERIALS: Shipping cartons



PACKING

1. Secure dust covers on equipment jacks.
2. Place radio set component (1) (RT illustrated) in carton (2).
3. Arrange fiberboard pads (3) as shown.
4. Replace equipment manuals (4).
5. Close flaps (5) and seal carton with tape (6).

NOTE

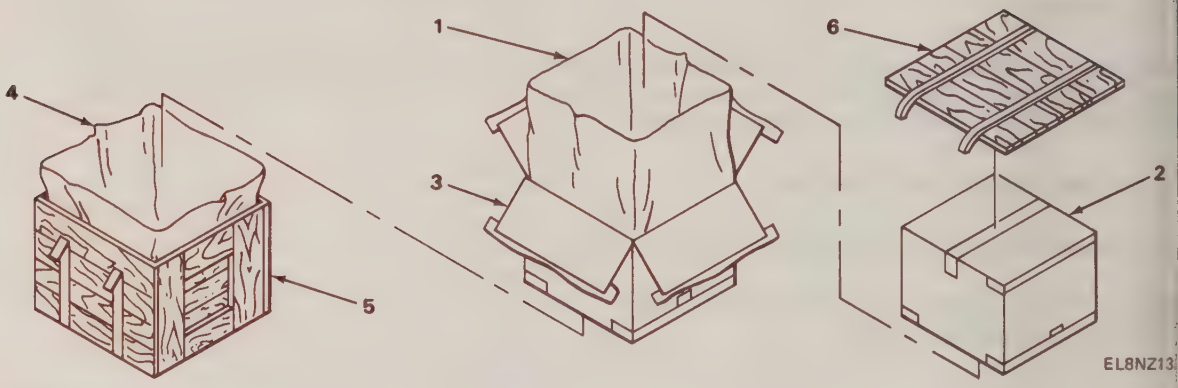
Carton must be marked with nomenclature, model identification, and serial number of radio component.

Place carton in secure storage area.

3-25. INTERMEDIATE STORAGE.

Intermediate storage means storage between 46 and 180 days.

TOOLS: Hammer
MATERIALS: Shipping cartons and box
Waterproof barrier wrap
PRELIMINARY PROCEDURE: Pack equipment as for administrative storage. (See paragraph 3-24.)



PACKING

1. Place waterproof barrier wrap (1) around equipment carton (2) and seal.
2. Place equipment carton in outer carton (3).
3. Place waterproof barrier wrap (4) around outer carton and seal.
4. Place outer carton in box (5) and nail box cover (6) to top of box.

NOTE

Box must be marked with nomenclature, model identification, and serial number of radio component.

Place box in secure storage area.

3-26. FLYABLE STORAGE.

Flyable or long-term storage is for more than 180 days. The packing and storage procedure is the same as intermediate storage. (See paragraph 3-25.)

APPENDIX A

REFERENCES

1. SCOPE.

e following is a list of all pamphlets, forms, service bulletins, and technical manuals referenced in related to this manual.

2. PAMPHLETS.

nsolidated Index of Army Publications and Blank Forms	DA PAM 310-1

3. FORMS.

commended Changes to Publications and Blank Forms	DA FORM 2028
commended Changes to Equipment Technical Manuals	DA FORM 2028-2
uipment Inspection and Maintenance Worksheet	DA FORM 2404
screpancy in Shipment Report (DISREP)	SF-361
port of Discrepancy (ROD)	SF-364
ality Deficiency Report	SF-368

4. SERVICE AND TECHNICAL BULLETINS.

hicular Radio Sets and Authorized Installations	SB 11-131
inting and Preservation Supplies Available for Field Use for Electronics Command Equipment	SB 11-573
ower Cover FSN 5820-K98-4055 for Mounting MT-1029/VRC	SB 11-586
arning Notice for Vehicles in Which Radios are Mounted	SB 11-624
eld Instructions for Painting and Preserving Electronics Command Equipment, Including Camouflage Pattern Painting of Electrical Equipment Shelters	TB 43-0118

5. TECHNICAL MANUALS.

perator's and Organizational Maintenance for Communications Security Equipment TSEC/KE-57	TM 11-5810-256-12
perator's and Organizational, Direct Support and General Support Maintenance Manual for Installation Kits, Electronic Equipment Used with Communications Security Equipment TSEC/KY-38 and HYL-3/TSEC	TM 11-5810-290-14&P
perator's and Organizational Maintenance Manual for NESTOR Communications Systems Using TSEC/KY-8 and TSEC/KY-38 with Radio Sets and Associated Equipment	TM 11-5810-300-12
perator's and Organizational Maintenance Manual: Installation Kits for Communications Security Equipment TSEC/KY-57	TM 11-5810-312-12

A-5. TECHNICAL MANUALS. (CONT)

Operator's Manual: Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 (5820-00-223-7437) (used without Intercom System)	TM 11-5820-401-10-1
Hand Receipt Technical Manual Covering End Item/Components of End Item (COEI). Basic Issue Items, and Additional Authorization List (AAL) for Radio Sets AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00-223-7415), AN/VRC-44 (5820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00-223-7435), and AN/VRC-49 (5820-00-223-7437), (used with Intercom System)	TM 11-5820-401-10-2-HR
Direct Support, General Support and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Control, Frequency Selector C-2742/VRC and Control, Radio Set C-2299/VRC	TM 11-5820-401-35-1
Direct Support, General Support and Depot Maintenance Manual Including Repair Parts and Special Tools Lists: Mounting MT-1029/VRC (FSN 5820-893-1323) and Mounting MT-1898/VRC (FSN 5820-893-1324)	TM 11-5820-401-35-9
Operator, Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists: Loudspeaker, Permanent Magnet LS-454/U	TM 11-5965-255-15P
Operator's, Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists: Headset, Electrical H-140A/U	TM 11-5965-260-15P
Organizational and DS Maintenance Manual Including Repair Parts and Special Tool Lists: Headset Microphone Dynamic H-161/U and H-161A/U	TM 11-5965-262-13
Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List): Handset H-189/GR (NSN 5965-00-069-8886)	TM 11-5965-280-15

. TECHNICAL MANUALS. (CONT)

erator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Antenna AS-1729/VRC (NSN 5985-00-985-9024)	TM 11-5985-262-14
erator's, Organizational and Direct Support Maintenance Manual for Antenna Group OE-254/GRC (NSN 5985-01-063-1574)	TM 11-5985-357-13
erator's, Organizational, and Direct Support Maintenance Manual: Antenna AS-2731/GRC (NSN 5985-01-017-0785)	TM 11-5985-355-13
e Army Maintenance Management System (TAMMS)	TM 38-750
ministrative Storage of Equipment	TM 740-90-1
ocedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)	TM 750-244-2

. MISCELLANEOUS PUBLICATIONS.

ol Kit, Electronic Equipment TK-101/G (NSN 5180-00-064-5178)	SC 5180-91-CL-R13
erator and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U	TM 11-6625-203-12

APPENDIX B

MAINTENANCE ALLOCATION

Section I INTRODUCTION

B-. GENERAL.

's appendix provides a summary of maintenance operations for the AN/VRC-12 series radio sets. It horizes categories of maintenance for specific maintenance functions on repairable items and nponents and the tools and equipment required to perform each function. This appendix may be d as an aid in planning maintenance operations.

B. MAINTENANCE FUNCTIONS.

intenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, d/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic or ctrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, , to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to olenish fuel, lubricants, chemical fluids, or gases.

d. Aline. To adjust specified variable elements of an item to bring about optimum or desired rformance.

e. Install. To install an item when required to perform service or other maintenance functions. stall may be the act of emplacing, seating, or fixing into position a spare, repair part, or module mponent or assembly) in a manner to allow the proper functioning of an equipment or system.

f. Replace. To substitute serviceable like-type part subassembly or module (component or sembly) for an unserviceable counterpart.

g. Repair. To apply maintenance services (inspect, test, service, adjust, aline, calibrate, place) or other maintenance actions (welding, grinding, riveting, straightening, facing, machining, or resurfacing). To restore serviceability to an item by correcting specific damage, ult, malfunction or failure in part, subassembly, module (component or assembly), end item or stem.

h. Overhaul. To restore an item to a completely serviceable/operational condition as required maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally e highest degree of maintenance performed by the Army. Overhaul does not normally return an item like-new condition.

B-3. COLUMN ENTRIES.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for the purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a worktime figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance categories, appropriate worktime figures will be shown for each category. The number of task-hours specified by the worktime figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating condition. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Eqpt. Column 5 specifies by code those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. TOOL AND TEST EQUIPMENT REQUIREMENTS.

a. Tool or Test Equipment Reference (Ref) Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated to the tool or test equipment.

TOOL AND TEST EQUIPMENT REQUIREMENTS. (CONT)

Nomenclature. This column lists the noun name and nomenclature of the tools and test ...ment required to perform the maintenance functions.

National/NATO Stock Number. This column lists the national/NATO stock number of the ...ific tool or test equipment.

Tool Number. This column lists the manufacturer's part number of the tool followed by the ...eral Supply Code for Manufacturers (FSCM) (5-digit) in parentheses.

REMARKS.

Reference Code. This code refers to the appropriate item in section II, column 6.

Remarks. This column provides the required explanatory information necessary to clarify ...s in section II.

Section II MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-12

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
00	RADIO SET AN/VRC-12								
01	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Sect XI)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Sect XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section III MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-43

) OUP BER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
	RADIO SET AN/VRC-43								
	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Sect XI)								
	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section IV MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-44

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
00	RADIO SET AN/VRC-44								
01	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Sect XI)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Sect XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section V MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-45

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
	RADIO SET AN/VRC-45								
	RECEIVER-TRANSMITTER, RADIO RT-246/VRC; RT-246A/VRC (See Sect XI)								
	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section VI MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-46

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
00	RADIO SET AN/VRC-46								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Sect XII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section VII MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-47

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
	RADIO SET AN/VRC-47								
	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Sect XII)								
	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Sect XIII)								
	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section VIII MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-48

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
00	RADIO SET AN/VRC-48								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Sect XII)								
03	RECEIVER, RADIO R-442/VRC; R-442A/VRC (See Sect XIII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section IX MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-49

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY. C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
	RADIO SET AN/VRC-49								
	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Sect XII)								
	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								

Section X MAINTENANCE ALLOCATION CHART FOR RADIO SET AN/VRC-54

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARI
			C	O	F	H	D		
00	RADIO SET AN/VRC-54								
02	RECEIVER-TRANSMITTER, RADIO RT-524/VRC; RT-524A/VRC (See Sect XII)								
04	ANTENNA AS-1729/VRC or equivalent (See Separate MAC in TM 11-5985-262-14)								
05	RADIO SET AN/VRC-24, AN/VRC-24A (See Separate MAC in TM 11-5920-222-20)								

Section XI MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
	RECEIVER-TRANSMITTERS, RADIO RT-246/ VRC AND RT-246A/VRC SM-D-413501 DL-SM-B-413500	Inspect	0.5	0.5				(See Sect XIV)	(See Sect XV)
		Test		0.5				1 thru 6	A
		Test			1.0			6 thru 23	B
		Test				1.5		6 thru 23	C
		Service		0.5				1	
		Aline			2.5			7 thru 23	
		Install		0.4				1,6,9	
		Replace		0.3				1	
		Repair			3.0			7 thru 23	D
		Repair				3.5		7 thru 24	
		Overhaul					50.0	24 thru 42,101 thru 136, 201 thru 220	
01	Control Assy (Front Panel Group) (A300, SM-D-414366)	Test			0.5			7 thru 13	B
		Repair			0.3			7 thru 9, 13	O
		Repair				0.5		7 thru 9, 13	G
		Repair					2.0	33,47, 130,133, 219	
0101	Tuner, Radio Frequency (A1000, SM-D-416345) (A1000A, SC-DL-414368)								E,AE
010101	Circuit Card Assembly (Antenna BD Assy) (A1100, SM-D-374983)	Aline			0.1			7,10, 21	F
		Replace			0.3			8,9	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
01010102	Circuit Card Assembly (1st RF Bd Assy) (A1200, SM-D-416370) (Same as Group 01010101)								
01010103	Amplifier, Radio Frequency (2nd RF Bd Assy) (A1300, SM-D-374990) (Same as Group 01010101)								
01010104	Mixer Stage, Frequency (Mixer Bd Assy) (A1400, A1400A, SM-D-374986) (Same as Group 01010101)								
01010105	Oscillator, Radio Frequency (Tuner Oscillator Bd) (A1500, SM-D-374989) (A1500A, SM-D-921094) (Same as Group 01010101)								X

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
10106	Power Supply (A1600, SM-C-416316) (A1600A, SM-C-921108)	Replace			0.1			8,9	X
10107	Receiver Sub-assembly SM-D-188980	Test			0.5			7,10,21	B
		Replace			0.5			8,9	
		Repair				0.5		8,9,28, 33,35, 43,44, 45	G
		Repair					0.7	128,129, 203	
10107	Receiver Sub-assembly (VR1001) (Parent Bd-Reg Assy) SM-D-188981	Replace			0.5			8,9	
010107 12	Filament Regulator (FL 1001) SM-D-188976	Test					0.5	7,10,21	B
		Replace					0.5	8,9	
010107 2	Tuner, VHF SM-D-416341	Test					0.5	7,10,21	B
		Repair					0.5	8,9	G
0102	Oscillator Assy, RF (A2000, SM-D-414430) (A2000A, SM-D-921126)	Test			0.3			7,10,21	B
		Aline					0.5	28,44, 210	Y
		Replace			0.3			8,9	X
		Repair					1.0	28,44, 132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
01010201	Oscillator Subassembly (Interpolation Osc) SM-D-414446 SM-D-921122	Test					0.3	7,10,21	B
		Aline					0.3	28,44, 210	Y
		Replace					0.5	8,9	X
		Repair					0.3	28,44, 132	
01010202	Oscillator Subassembly (Reference Osc) SM-D-414456 SM-D-921132 (Same as Group 01010201)								
01010203	Switch Assy SM-D-414463 SM-D-921138 (A-MDL)	Repair					0.3	See 010102	
		Replace					0.5		
		Repair					0.3		
010103	Oscillator – Buffer (A6000, A6000A, SM-D-416342)								E,A
01010301	Oscillator – Buffer (Osc-Buff and Parent Bd) SM-D-188989	Test			0.3			8,9,11, 13	B
		Test					0.3	28,45, 207	
		Replace			0.3			8,9	
		Repair				0.5		8,9	O
		Repair					0.8	28,45, 132,207	
01010301 01	Circuit Card Assy (Parent Board) (TB06001) SM-D-416335	Test				0.3		8,9,11, 13	B
		Replace				0.2		8,9	
		Repair				0.2		8,9	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
10301	Oscillator – Buffer (Case and Tuner) SM-D-416343	Test			0.4			7,10,21	B
		Test					0.5	28,35, 44,215	
		Replace				0.2		8,9	
		Repair				0.3			
		Repair					1.0	28,35, 44,132, 215	
		Test					0.2	28,35, 44,215	
10302	Electronic Component (Oscillator Assy) (A6300, A6300A, SM-D-374993)	Aline			0.3			7,10,21	F
		Replace			0.1			8,9	X
10303	Buffer Board (A6400, A6400A, SM-D-374996) (Same as Group 01010302)								X
0104	Null Switch Assy (A7000, SM-C-414770)	Test					0.2	33 thru 218	
		Adjust					0.1	33 thru 132, 218	
		Replace			0.2			8,9	
		Repair					0.4	33,132, 218	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMAR
010105	Selector Control Assy (A7100, SM-C-414649)	Test					0.2	33 thru 218	
		Replace			0.3			8,9	
		Repair			0.3			8,9	T
		Repair				1.0		8,9	U
		Repair					2.0	33,132, 218	
010106	Amplifier, Synchro (A7200, SM-D-414741) (A7200A, SM-D-921412)	Replace			0.3			8,9	X
010107	Control Wiring Assy SM-E-414411								E
01010701	Wiring Harness Assy SM-E-414413	Test			0.3			13	B
		Test					0.5	47	
		Repair			0.2			8,9,21	O
		Repair				1.0		8,9,21	G
		Replace					1.0	126,130 thru 132	
010108	Switch Assy SM-D-414632	Test				0.2		21	B
		Replace				0.7		8,9	
		Repair				0.5		8,9	
010109	Panel and Housing Assy SM-D-414496	Repair			0.5			8,9	T
		Repair				0.8		8,9	C
		Repair					1.5	132	
01010901	Panel Assy SM-D-414500	Repair			0.3			8,9	O
		Repair				0.5		8,9	G,I
		Repair					0.6	8,9	
01010902	Gear Set Assembly SM-D-414525	Replace				0.8			
		Repair					0.8	130,131, 132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
?	Crystal Reference System Assembly (A3000, A3000A, SM-D-413519)	Test			0.3			7,10,21	B
		Test					0.5	28,33, 35,45	
		Repair			0.5			8,9	K
		Repair					0.8	28,35, 43,45, 204,132	AE
201	Harmonic Generator Assembly (A3100, SM-B-413559) (A3100A, SM-D-921201)	Replace			0.1			8,9	X
202	Balanced Mixer Assembly (A3200, SM-B-413692) (A3200A, SM-B-921185) (Same as Group 010201)								
203	Second Mixer Assembly (A3300, SM-B-413611) (A3300A, SM-B-921213) (Same as Group 010201)								
204	1st and 2nd IF Amplifier Assy (A3400, SM-B-413634) (A3400A, SM-D-921227) (Same as Group 010201)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMA
			C	O	F	H	D		
010205	3rd IF and Limiter Assy (A3500, SM-B-413650) (A3500A, SM-B-921241) (Same as Group 010201)								
010206	Hunt Freq Discr Assembly (A3600, SM-B-413670) (A3600A, SM-B-921255) (Same as Group 010201)								
010207	Phase Discr Assembly (A3700, SM-B-413699) (A3700A, SM-D-921271) (Same as Group 010201)								
010208	Chassis Assembly, Electrical (A1, SM-D-413528)	Test			0.3			13	B
		Test					0.5	204	
		Replace			0.5			8,9	
		Repair			0.5			8,9	L
		Repair					0.7	132	
0103	Amplifier Assembly, IF (A4000, A4000A, SM-C-413717)	Test			0.3			7,10,21	B
		Test					0.3	28,35, 37,44, 46,205	
		Aline			0.4			7,10,21	F
		Repair			0.3			8,9	K,A
		Repair					0.5	28,35, 37,44, 46,132, 205	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
301	1st and 2nd IF Amplifier Assy (A4100, SM-C-413726) (A4100A, SM-C-921285)	Replace			0.2			8,9	X
302	Limiter Discriminator (A4200, SM-C-413753) (A4200A, SM-D-921300)	Aline Replace			0.3 0.2			7,10,21 8,9	F,Y X,Y
303	Amplifier Audio (Audio & Squelch Preamp Assy) (A4300, SM-B-413785) (A4300A, SM-D-921316)	Aline Replace			0.3 0.2			10,17, 21 8,9	F X
304	Chassis Assembly, Electrical (A1, SM-D-413802)	Test Test Replace Repair Repair			0.2 0.5	0.2 0.5	0.5	13 13,21 8,9 8,9 132	B B H
4	Amplifier Assy, IF (Audio and Squelch Amplifier) (A5000, A5000A, SM-D-413820)	Test Test Aline Replace Repair Repair			0.3 0.2 0.2 0.5		0.3 0.5	7,10,21 28,32, 36,37, 45,206 7,10,21 8,9 8,9 28,32, 36,37, 45,132, 206	B F K,Z

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
010401	Amplifier, Audio Frequency Assy (Rcvr Audio Amplifier) (A5100, SM-C-413834) (A5100A, SM-C-921332)	Replace			0.2			8,9	X
010402	Amplifier, Limiter (Rcvr Squelch Amplifier) (A5200, SM-C-413849) (A5200A, SM-C-921347)	Aline Replace			0.2 0.2			7,10,21 8,9	F Z
010403	Filter, Band Pass (Squelch Filter) (A5300, SM-B-413860) (A5300A, SM-C-921362)	Test Aline Replace			0.3 0.2 0.2			7,10,21 7,10,21 8,9	 F Z
010404	Chassis Assy, Electrical (A1, SM-D-413879)	Test Replace Repair Repair			0.3 0.2 0.3	 0.5		13 8,9 8,9 8,9	B N M

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
	Transmitter Speech Amplifier and Modulator Assy (A8000, A8000A, AM-C-414170)	Test			0.3			7,10,21	B
		Aline			0.5			7,10,21	F
		Test					0.3	27,28, 32,35, 36,37, 208	
		Repair				0.3		8,9	M
		Repair					0.5	26,27,28, 32,35, 37,132, 208	
		Repair			0.3			8,9	K,AE
0501	Modulator, Radio XMTR (11.5 MHz Modulator Assy) (A8100, SM-B-414176) (A8100A, SM-C-921436)	Aline			0.5			7,10,21	F
		Replace			0.2			8,9	X
		Repair					0.5	27,28, 34,44, 132,216	
0502	Transmitter Phase Discriminator Assy (A8200, SM-B-414215) (A8200A, SM-B-92145)	Test					0.3	27,28, 34,44, 216	
		Replace			0.2			8,9	X
		Repair					0.3	27,28, 34,44, 132,216	
0503	Transmitter IF (1st and 2nd IF amplifier Assy) (A8300, A8300A, SM-B-414197) (Same as Group 010502)								X

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
010504	Generator REF Signal (Hunt Generator) (A8400, A8400A, SM-B-374963) (Same as Group 010502)								X
010505	Transmitter Speech Amplifier Assy (A8500, SM-B-414238) (A8500A, SM-C-921485)	Aline			0.4			7,10,21	F
		Replace			0.2			8,9	X
010506	Chassis Assy, Electrical (A1, SM-C-414276)	Test				0.2		13	B
		Test					0.2	27,28, 32,35, 36,37, 208	
		Replace			0.3			8,9	
		Repair			0.3			8,9	N
		Repair				0.5		8,9	M
		Repair					0.5	132,208	
0106	Power Supply Assy (A9000, SM-D-414304) (A9000A, SM-D-921504)	Test				0.3		13,24	B
		Test					0.3	24,29, 33,37, 217	
		Replace			0.2			8,9	AA
		Repair			0.3			8,9	O,A
		Repair				0.4		8,9,24	G,A
		Repair					1.0	24,29, 33,37, 132,217	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
01	Power Supply, Electrical (Circuit	Test					0.3	24,29, 33,37, 217	
	Board Assy)	Replace				0.5		8,9	AB
	(A9000-2, SM-D-414310)	Repair				0.5		8,9	O
	(A9000A-2, SM-D-921544)	Repair					0.8	24,29, 33,37, 132,217	
02	Circuit Card Assy (Cover	Replace			0.1			8,9	
	Assy)	Repair				0.3		8,9	O
	(A9000-1, SM-D-414322)	Repair					0.5	24,29, 33,37, 132,217	
	(A9000A-1, SM-D-921507)								
03	Chassis Assembly (A9000, SM-D-414331) (A9000A, SM-D-921514)	Repair					0.5	132	AB
04	Resistor Assembly (A9000, SM-C-414344) (A9000A, SM-D-921525)	Test				0.3		13	B
		Replace				0.5		8,9	AB
		Repair				0.3		8,9	
05	Power Supply Panel Assy (A9000, SM-C-414351) (A9000A, SM-B-921523)	Repair				0.2		8,9	O,AB
		Repair					0.4	132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMA
			C	O	F	H	D		
0107	Semiconductor Device Assy (A9400, A9400A, SM-D-413928) (A9400B, SM-D-921530)	Test			0.3			13	P
		Test				0.3		11,13,24	B
		Replace			0.2			8,9	AA
		Repair			0.5			8,9	O,A
		Repair				0.5		8,9	AB
0108	Power Amplifier Assy (A6200, SM-D-439956)	Test			0.5			7,10,21	B
		Test					0.5	202	
		Aline			0.8			7,10,21	F
		Replace			0.2			8,9	
		Repair			1.0			8,9	H
		Repair				1.5		8,9	O
		Repair					2.0	33,35, 38,39, 132,202	
010801	RF Amplifier Assy (Final Amplifier) (A6201, SM-D-413994)	Repair			0.7			8,9	O
		Repair				1.0		8,9	A
		Repair					1.0	132	
010802	Gear Set (MP6201, SM-D-413982)	Replace			0.2			8,9	
		Repair			0.3			8,9	O
		Repair				0.3		8,9	
010803	Wiring Assembly SM-E-413971	Test			0.2			13	B
		Repair			0.5			8,9	O
		Repair				1.0		8,9	
01080301	Wiring Harness Assy SM-E-413975	Test				0.2		13	B
		Repair				0.5		8,9	
010804	Tank Circuit Assy (Z6201, SM-D-413999)	Test					0.2	202	
		Repair			0.3			8,9	O
		Repair				0.5		8,9	G
		Replace					0.7	8,9	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
805	Amplifier Subassembly (Driver) (A6100, SM-D-414045)	Test					0.3	202	
		Aline			0.3			7,10,21	F
		Replace			0.5			8,9	
		Repair			0.5			8,9	Q
		Repair				0.5		8,9	O
9	Voltage Regulator Assy (Voltage Regulator and Housing) (A400, SM-D-414112)	Test			0.5			7,13.21	B
		Test					0.8	47	
		Repair			0.8			8,9	O
		Repair				1.5		8,9	G,I, J,V
		Repair					1.5	132	
0901	Voltage Regulator Assy (A2100, SM-D-414157) (A2100A, SM-D-921166)	Replace			0.5			8,9	X
0902	Chassis Assembly, Electrical (A1, SM-C-414149)	Test				0.3		7,13,21	B
		Repair			0.3			8,9	H
		Repair				0.3		8,9	
		Replace				0.5		8,9	
0903	Wiring Assy, Voltage Reg (Chassis Wiring Assy) SM-E-414135	Test			0.8			7,13	B
		Test					0.8	47	
		Repair				0.8		8,9	G
		Repair					0.8	132	
090301	Wiring Harness Assy SM-E-414137	Test					0.5	47	
		Replace					1.0	132	
0904	Housing Assembly SM-D-414163	Repair					0.5	132	
		Replace					1.0	132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
0110	Gear Set Assembly (Intermediate Gear Train) (A6, SM-D-413892)	Test Replace Repair Repair				0.1 0.3 1.0	 1.5	8,9 8,9 8,9 101	B R
0111	Cover Assembly (Rt Side) SM-C-414284	Replace		0.1				1	
0112	Cover Assembly (Bottom) SM-D-414288	Replace Repair Repair		0.1	 0.3	 0.5		1 8,9 8,9	 S
0113	Cover Assembly (Top) SM-D-414297	Replace Repair		0.1		 0.5		1 8,9	
0114	Cover Assembly (Heat Exchanger) SM-C-414361 (Same as Group 0111)								
0115	Handle and Guard Assy (Right) (FSCM 14850, A1-8882D)	Replace Install Repair		0.1	 0.5 0.5			1 8,9 8,9	 W
0116	Handle and Guard Assy (Left) (FSCM 14850, A1-8883D) (Same as Group 0115)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER TRANSMITTER, RADIO RT-246/VRC AND RT-246A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
17	Cover (X-mode) SM-D-414382	Replace			0.1				

Section XII MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARK
02	RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC SM-D-414826 SC-DL-414825	Inspect	0.5	0.5					
		Test		0.5				1 thru 6	A
		Test			1.0			6 thru 23	B
		Test				1.5		6 thru 23	C
		Service		0.5				1	
		Aline			2.5			7 thru 23	
		Install		0.4				1,8,9	
		Replace		0.3				1	
		Repair			3.0			7 thru 23	D
		Repair				3.5		7 thru 24	
		Overhaul					50.0	24 thru 47,101 thru 136, 201 thru 220	
0201	Control Assy (Front Panel Group) (A350, SM-D-414830)	Test			0.5			7 thru 13	B
		Repair			0.3			7,9,13	O
		Repair				0.5		7,9,13	G
		Repair					2.0	33,47, 130,131, 219	
020101	Tuner, Radio Frequency (A1000, SM-D-416345) (A1000A, SC-DL-414368)								E,AE
02010101	Circuit Card Assembly (Antenna Bd Assy) (A1100, SM-D-374983)	Aline			0.1			7,10,21	F
		Replace			0.3			8,9	
02010102	Circuit Card Assembly (1st RF Bd Assy) (A1200, SM-D-416370)- (Same as Group 02010101)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
10103	Amplifier, Radio Frequency (2nd RF Bd Assy) (A1300, SM-D-374990) (Same as Group 02010101)								
010104	Mixer Stage, Frequency (Mixer Bd Assy) (A1400, A1400A, SM-D-374986) (Same as Group 02010101)								X
010105	Oscillator, Radio Frequency (Tuner Oscillator Bd) (A1500, SM-D-374989) (A1500A, SM-D-921094) (Same as Group 02010101)								X
010106	Power Supply (A1600, SM-C-416316) (A1600A, SM-C-921108)	Replace			0.2			8,9	X

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
02010107	Receiver Subassembly SM-D-188980	Test			0.5			7,10,21	B
		Replace			0.5			8,9	
		Repair				0.5		8,9	G
		Repair					0.7	28,33,35, 43,44, 45,128, 129,203	
02010107 01	Receiver Subassembly (VR1001) (Parent Bd-Reg Assy) SM-D-188981	Replace					0.5	8,9	
02010107 012	Filament Regulator SM-D-188976	Test					0.5	7,10,21	
		Replace					0.5	8,9	
02010107 02	Tuner, VHF SM-D-416341	Test					0.5	7,10,21	
		Repair					0.5	8,9	G
020102	Oscillator Assy, RF (A2000, SM-D-414430) (A2000A, SM-D-921126)	Test			0.3			7,10,21	B
		Aline					0.5	28,44, 210	Y
		Replace			0.3			8,9	X
		Repair					1.0	28,44, 132	
02010201	Oscillator Subassembly (Interpola-tion Osc) SM-D-414446 (SM-D-921122, A-MDL)	Test					0.3	7,10,21	B
		Aline					0.3	28,44, 210	Y
		Replace					0.5	8,9	X
		Repair					0.3	28,44, 132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
2010202	Oscillator Subassembly (Reference Osc) SM-D-414456 (SM-D-921132, A-MDL) (Same as Group 02010201)								
2010203	Switch Assy SM-D-414463 (SM-D-921138, A-MDL)	Repair					0.3	28,44, 132	
		Replace					0.5	8,9	X
		Repair					0.3	28,44, 132	
20103	Oscillator Buffer (A6000, A6000A, SM-D-416342)								E E,AE
2010301	Oscillator-Buffer (Osc-Buff & Parent BD) SM-D-188989	Test			0.3			8,9,11, 13	B
		Test					0.3	28,45, 207	
		Replace			0.3			8,9	
		Repair				0.5		8,9	O
		Repair					0.8	28,45, 207,132	
2010301 01	Circuit Card Assy (Parent Board) (TB6001, SM-D-416335)	Test				0.3		8,9,11, 13	B
		Replace				0.2		8,9	
		Repair							

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
02010301 02	Oscillator-Buffer (Case & Tuner) SM-D-416343	Test			0.4			7,10,21	B
		Test					0.5	28,35, 44, 215	
		Replace				0.2		8,9	
		Repair				0.3		8,9	G
		Repair					1.0	28,35, 44,132, 215	
02010302	Electronic Component (Oscillator Assy) (A6300, A6300A, SM-D-374993)	Aline			0.3			7,10,21	F
		Replace			0.1			8,9	X
02010303	Buffer Board (A6400, A6400A, SM-D-374996) (Same as Group 02010302)								X
020104	Control Wiring Assy SM-E-414837								E
02010401	Wiring Harness Assy SM-E-414839	Test			0.3			13	B
		Test					0.5	47	
		Repair			0.2			8,9,21	O
		Repair				1.0		8,9,21	G
		Replace					1.0	126,130, 132	
02010401 01	Switch Assembly SM-D-414632	Test				0.2		21	B
		Replace				0.7		8,9	
		Repair				0.5		8,9	
020105	Panel & Housing Assy SM-D-414841	Repair			0.5			8,9	T
		Repair				0.8		8,9	C
		Repair					1.5	8,9	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
010501	Panel Assy SM-D-414843	Repair			0.3			8,9	O
		Repair				0.5		8,9	G
		Repair					0.6	8,9	
010502	Gear Set Assembly SM-D-414849	Replace				0.8		8,9	
		Repair					0.8	131,132	
02	Crystal Reference System Assembly (A3000, A3000A, SM-D-413519)	Test			0.3			7,10,21	B
		Test					0.5	28,33, 35,45	
		Repair			0.5			8,9	K
		Repair					0.8	28,35, 43,45, 132,204	AE
20201	Harmonic Generator Assembly (A3100, SM-B-413559) (A3100A, SM-D-921201)	Replace			0.1			8,9	X
20202	Balanced Mixer Assembly (A3200, SM-B-413592) (A3200A, SM-B-921185) (Same as Group 020201)								Y
20203	Second Mixer Assembly (A3300, SM-B-413611) (A3300A, SM-B-921213) (Same as Group 020201)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARK
020204	1st and 2nd IF Amplifier Assembly (A3400, SM-B-413634) (A3400A, SM-D-921227) (Same as Group 020201)								
020205	3rd IF Amplifier and Limiter (A3500, SM-B-413650) (A3500A, SM-B-921241) (Same as Group 020201)								
020206	Hunt Freq Discr Assembly (A3600, SM-B-413670) (A3600A, SM-B-921255) (Same as Group 020201)								
020207	Phase Discr Assembly (A3700, SM-B-413699) (A3700A, SM-D-921271) (Same as Group 020201)								
020208	Chassis Assembly, Electrical (A1, SM-D-413528)	Test			0.3			13	B
		Test					0.5	204	
		Replace			0.5			8,9	
		Repair			0.5			8,9	L
		Repair					0.7	132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
03	Amplifier Assembly, IF (A4000, A4000A, SM-C-413717)	Test			0.3			7,10,21	B
		Test					0.3	28,35, 37,44, 46,205	
		Aline			0.4			7,10,21	F
		Repair			0.3			8,9	K,AE
		Repair					0.5	28,35, 37,44, 46,132, 205	
0301	1st & 2nd IF Amplifier Assembly (A4100, SM-C-413726) (A4100A, SM-C-921285)	Replace			0.2			8,9	X
20302	Limiter Discriminator (A4200, SM-C-413753) (A4200A, SM-D-921300)	Aline			0.3			7,10,21	F,Y
		Replace			0.2			8,9	X,Y
20303	Amplifier Audio (Audio & Squelch Preamp Assy) (A4300, SM-B-413785) (A4300A, SM-D-921316)	Aline			0.3			10,17,21	F
		Replace			0.2			8,9	X
20304	Chassis Assembly, Electrical (A1, SM-D-413802)	Test			0.2			13	B
		Test				0.2		13,21	B
		Replace			0.5			8,9	
		Repair				0.5		8,9	H
		Repair					0.5	132	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARK
			C	O	F	H	D		
0204	Amplifier Assy, IF (Audio and Squelch Amplifier) (A5000, A5000A, SM-D-413820)	Test			0.3			7,10,21	B
		Test					0.3	28, 32, 36,37, 45,206	
		Aline			0.2			7,10,21	F
		Replace			0.2			8,9	
		Repair			0.5			8,9	K,Z
		Repair				0.5		8,9	M
		Repair					0.5	28,32, 36,37, 45,132, 206	
020401	Amplifier, Audio Freq, Assy (Rcvr Audio Amplifier) (A5100, SM-C-413834) (A5100A, SM-C-921332)	Replace			0.2			8,9	X
020402	Amplifier, Limiter (Rcvr Squelch Amplifier (A5200, SM-C-413849) (A5200A, Amplifier, DC, SM-C-921347)	Aline			0.2			7,10,21	F
		Replace			0.2			8,9	Z
020403	Filter, Band Pass (Squelch Filter) (A5300, SM-B-413860) (A5300A, SM-C-921362)	Test			0.3			7,10,21	
		Aline			0.2			7,10,21	F
		Replace			0.2			8,9	Z

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0404	Chassis Assy, Electrical (A1, SM-D-413879)	Test			0.3			13	B
		Replace			0.2			8,9	
		Repair			0.3			8,9	N
		Repair				0.5		8,9	M
05	Transmitter Speech Ampl and Modulator Assy (A8000, A8000A, SM-C-414170)	Test			0.3			7,10,21	B
		Test					0.3	27,28, 32,35, 36,37, 208	
		Aline			0.5			7,10,21	F
		Repair			0.3			8,9	K,AE
		Repair				0.3		8,9	M
		Repair					0.5	27,28, 32,35, 36,37, 132,208	
0501	Modulator, Radio XMTR (11.5 MHz Modulator Assy) (A8100, SM-B-414176) (A8100A, SM-C-921436)	Aline			0.5			7,10,21	F
		Replace			0.2			8,9	X
20502	Transmitter Phase Discriminator Assy (A8200, SM-B-414215) (A8200A, SM-B-921451)	Replace			0.2			8,9	X

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARK
			C	O	F	H	D		
020503	Transmitter, IF 1st and 2nd Amplifier Assy (A8300, A8300A, SM-B-414197) (Same as Group 020502)								X
020504	Generator, Ref Signal (Hunt Generator) (A8400, A8400A, SM-B-374963) (Same as Group 020502)								X
020505	Transmitter Speech Amplifier Assy (A8500, SM-B-414238) (A8500A, SM-C-921485)	Aline			0.4			7,10,21	F
		Replace			0.2			8,9	X
020506	Chassis Assy, Electrical (A1, SM-C-414276)	Test				0.2		13	B
		Test					0.2	27,28, 32,35, 36,37, 208	
		Replace			0.3			8,9	
		Repair			0.3			8,9	N
		Repair				0.5		8,9	M
		Repair					0.5	132,208	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
06	Power Supply Assy (A9000, SM-D-414304) (A9000A, SM-D-921504)	Test				0.3		13,24	B
		Test					0.3	24,29, 33,37, 217	
		Replace			0.2			8,9	AA
		Repair			0.3			8,9	O,AB
		Repair				0.4		8,9,24	B,AB
		Repair					1.0	24,29, 32,33, 132,217	
0601	Power Supply, Electrical (Circuit Board Assy) (A9000-2, SM-D-414310) (A9000A-2, SM-D-921544)	Test					0.3	24,29, 33,37, 217	
		Replace				0.5		8,9	AB
		Repair				0.5		8,9	O
		Repair					0.8	24,29, 32,33, 132,217	
20602	Circuit Card Assy (Cover Assy) (A9000-1, SM-D-414322) (A9000A-1, SM-D-991507)	Replace			0.1			8,9	
		Repair				0.3		8,9	O
		Repair					0.5	24,29, 32,33, 132,217	
20603	Chassis Assembly (A9000, SM-D-414331) (A9000A, SM-D-921514)	Repair					0.5	132	AB
20604	Resistor Assembly (A9000, SM-C-414344) (A9000A, SM-D-921525)	Test				0.3		13	B
		Replace				0.5		8,9	AB
		Repair				0.3		8,9	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
020605	Power Supply Panel Assy (A9000, SM-C-414351) (A9000A, SM-B-921523)	Repair				0.2		8,9	O,AB
		Repair					0.4	132	
0207	Semiconductor Device Assy (A9400, A9400A, SM-D-413928) (A9400B, SM-D-921530)	Test			0.3			13	P
		Test				0.3		11,13,24	B
		Replace			0.2			8,9	AA
		Repair			0.5			8,9	O,AC
		Repair				0.5		8,9	AB
0208	Power Amplifier Assy (A6200, SM-D-439956)	Test			0.5			7,10,21	B
		Test					0.5	202	
		Aline			0.8			7,10,21	F
		Replace			0.2			8,9	
		Repair			1.0			8,9	H
		Repair				1.5		8,9	O
		Repair					2.0	33,35, 38,39, 132,202	
020801	RF Amplifier Assy (Final Amplifier) (A6201, SM-D-413994)	Repair			0.7			8,9	O
		Repair				1.0		8,9	G
		Repair					1.0	132	
020802	Gear Set (MP6201, SM-D-413982)	Replace			0.2			8,9	
		Repair			0.3			8,9	O
		Repair				0.3		8,9	
020803	Wiring Assembly SM-E-413971	Test			0.2			13	B
		Repair			0.5			8,9	O
		Repair				1.0		8,9	
02080301	Wiring Harness Assy SM-D-413975	Test				0.2		13	B
		Repair				0.5		8,9	

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
0804	Tank Circuit Assy (Z6201, SM-D-413999)	Test					0.2	202	
		Repair			0.3			8,9	O
		Repair				0.5		8,9	G
		Replace					0.7	8,9	
0805	Amplifier Sub-assembly (Driver) (A6100, SM-D-414045)	Test					0.3	202	
		Aline			0.3			7,10,21	F
		Replace			0.5			8,9	
		Repair			0.5			8,9	Q
		Repair				0.5		8,9	O
080501	Tuner, Radio-Frequency (Driver Tuning Assy) (A6102, SM-D-414048)	Test					0.2	202	
		Replace			0.3				
		Repair					0.5	8,9	O
		Repair					0.5	33,35, 38,39, 132,202	
080502	Driver Ampl Assy (A6101, SM-D-414063)	Test			0.3			7,10,21	B
		Test					0.5	202	
		Replace					0.5		
		Repair				1.0		8,9	G
		Repair					1.0	33,35, 38,39, 132,202	
209	Voltage Regulator Assy (Voltage Regulator and Housing) (A400, SM-D-414112)	Test			0.5			7,13,21	B
		Test					0.8	47	
		Repair			0.8			8,9	O
		Repair				1.5		8,9	G
		Repair					1.5	132	
20901	Voltage Regulator Assy (A2100, SM-D-414157) (A2100A, SM-D-921166)	Replace			0.5			8,9	X

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
020902	Chassis Assembly, Elec (A1, SM-C-414149)	Test				0.3		7,13,21	B
		Repair			0.3			8,9	H
		Repair				0.3		8,9	
		Replace				0.5		8,9	
020903	Wiring Assy, Voltage Reg (Chassis Wiring Assy) SM-E-414135	Test			0.8			7,13,21	B
		Test					0.8	47	
		Repair				0.8		8,9	G,I, J,V
		Repair					0.8	132	
02090301	Wiring Harness Assy SM-E-414137	Test					0.5	47	
		Replace					1.0	132	
020904	Housing Assembly SM-D-414163	Repair					0.5	132	
		Replace					1.0	132	
0210	Gear Set Assembly (Intermediate Gear Train) (A6, SM-D-413892)	Test				0.1		8,9	B
		Replace				0.3		8,9	
		Repair				1.0		8,9	R
		Repair					1.5	101	
0211	Cover Assembly (Rt Side) SM-C-414284	Replace		0.1				1	
0212	Cover Assembly (Bottom) SM-D-318065 (SM-D-414288)	Replace		0.1				1	AD
		Repair			0.3			8,9	
0213	Cover Assembly (Top) SM-D-414297	Replace		0.1				1	
		Repair			0.3			8,9	
0214	Cover Assembly (Heat Exchanger) SM-C-414361 (Same as Group 0211)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER-TRANSMITTERS, RADIO RT-524/VRC AND RT-524A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
15	Handle and Guard Assy (Right) (14850) A1-8882D	Replace Install Repair		0.1	 0.5 0.5			1 8,9 8,9	W
16	Handle and Guard Assy (Left) (14850) A1-8883D (Same as Group 0215)								
17	Cover (x-mode) SM-D-414382	Replace			0.1				

Section XIII MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARK
03	RECEIVER RADIO	Inspect	0.5	0.5					
	R-442/VRC AND	Test		0.5				1 thru 6	A
	R-442A/VRC	Test			1.0			6 thru 23	B
	DL-SM-B-414900	Test				1.5		6 thru 23	C
	SM-D-414901	Service		0.5				1	
		Aline			2.5			7 thru 23	
		Install		0.4				1,8,9	
		Replace		0.3				1	
		Repair			3.0			7 thru 23	D
		Repair				3.5		7 thru 24	
		Overhaul					40.0	24,47, 101 thru 136,201 thru 220	
0301	Control Assy (Front Panel Group) (A100, SM-D-414915)	Test			0.5			7 thru 13	B
		Repair			0.3			7 thru 9, 13	O
		Repair				0.5		7 thru 9, 13	G
		Repair					2.0	24,47, 101,136, 201,220	
030101	Tuner, Radio Frequency (A1000, SM-D-416345) (A1000A, SC-DL-414368)								E, AE
03010101	Circuit Card Assembly (Antenna Bd Assy) (A1100, SM-D-374983)	Aline			0.1			7,10,21	F
		Replace			0.3			8,9	
03010102	Circuit Card Assembly (1st Rf Bd Assy) (A1200, SM-D-416370) (Same as Group 02010101)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
10103	Amplifier, Radio Frequency (2nd Rf Bd Assy) (A1300, SM-D-374990) (Same as Group 02010101)								
010104	Mixer Stage, Frequency (Mixer Bd Assembly) (A1400, A1400A, SM-D-374986) (Same as Group 02010101)								X
010105	Oscillator, Radio Frequency (Tuner Oscillator Bd) (A1500, SM-D-374989) (A1500A, SM-D-921094) (Same as Group 02010101)								X
010106	Power Supply (A1600, SM-C-416316) (A1600A, SM-C-921108)	Replace			0.2			8,9	X
010107	Receiver Subassembly SM-D-188980	Test Replace Repair Repair			0.5 0.5	 0.5	 0.7	7,10,21 3,6 28,33, 35,43, 44,45, 128,129, 132,205	B G

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
03010107 01	Receiver Sub-assembly (VR 1001) (Parent Bd-Reg Assy) SM-D-188981	Replace				0.5		3,6	
03010107 012	Filament Regulator SM-D-188976	Test Replace					0.5 0.5	7,10,21 3,6	
03010107 02	Tuner, VHF SM-D-416341	Test Repair					0.5 0.5	7,10,21 28,33, 35,43, 44,45, 128,129, 132,205	
030102	Oscillator Assy, Rf (A2000, SM-D-414430)	Test Aline			0.3		 0.5	7,10,21 28,44, 210	B Y
	(A2000A, SM-D-921126)	Replace Repair			0.3		 1.0	8,9 28,44, 132,210	X
03010201	Oscillator Sub-assembly (Inter-polation Osc) SM-D-414446 SM-D-921122 (A-MDL)	Test Aline Replace Repair					0.3 0.3 0.5 0.3	7,10,21 28,44, 210 8,9 28,44, 132,210	B Y X
03010202	Oscillator Sub-assembly (Ref-erence Osc) SM-D-414456 SM-D-921132 (A-MDL) (Same as Group 02010201)								

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
10203	Switch Assy SM-D-414463	Repair					0.3	28,44, 132,210	
	SM-D-921138 (A-MDL)	Replace					0.5	8,9	
		Repair					0.3	28,44, 132,210	
103	Control Wiring Assy SM-E-414918								E
10301	Wiring Harness Assy SM-D-414922	Test			0.3			13	B
		Test					0.5	47	
		Repair			0.2			8,9	O
		Repair				1.0		8,9	G
		Replace					1.0	126,130, 132	
0104	Panel and Housing Assy SM-D-414936	Repair			0.5			8,9	T
		Repair				0.8		8,9	C
		Repair					1.5	132,220	
010401	Panel Assy SM-D-414932	Repair			0.3			8,9	O
		Repair				0.5		8,9	G
		Repair					0.6	132,220	
010402	Gear Set Assembly SM-D-414938	Replace				0.8		8,9	
		Repair					0.8	132,220	
02	Crystal Reference System Assembly (A3000, A3000A, SM-D-413519)	Test			0.3			7,10,21	B
		Test					0.5	28,35,43, 45,204	
		Repair			0.5			8,9	K
		Repair					0.8	28,35,43, 45,132, 204	AE
0201	Harmonic Generator Assembly (A3100, SM-B-413559) (A3100A, SM-D-921201)	Replace			0.1			8	X

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARK
			C	O	F	H	D		
030202	Balanced Mixer Assembly (A3200, SM-B-413592) (A3200 A, SM-B-921185) (Same as Group 030201)								Y
030203	Second Mixer Assembly (A3300, SM-B-413611) (A3300A, SM-B-921213) (Same as Group 030201)								X X
030204	1st and 2nd IF Amplifier Assembly (A3400, SM-B-413634) (A3400A, SM-D-921227) (Same as Group 030201)								X
030205	3rd IF Amplifier & Limiter (A3500, SM-B-413650) (A3500A, SM-B-921241) (Same as Group 030201)								X

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
206	Hunt Freq Discr Assy (A3600, SM-B-413670) (A3600A, SM-B-921255) (Same as Group 030201)								X
0207	Phase Discr Assy (A3700, SM-B-413699) (A3700A, SM-D-921271) (Same as Group 030201)								X
0208	Chassis Assembly, Electrical (A1, SM-D-413528)	Test Test Replace Repair Repair			0.3 0.5 0.5		0.5 0.7	13 204 8,9 8,9 132	B L
03	Amplifier Assembly, IF. (A4000, A4000A, SM-C-413717)	Test Test Test Aline Replace Repair Repair			0.3 0.4 0.5 0.3		 0.3 0.3 0.5	7,10,21 28,35, 37,44, 46,205 7,10,21 8,9 8,9 28,35, 37,44, 46,132, 205	B K,AE

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARK
			C	O	F	H	D		
030301	1st and 2nd IF, Amplifier Assembly (A4100, SM-C-413726) (A4100A, SM-C-921285)	Replace			0.2			8,9	X
030302	Limiter Discriminator (A4200, SM-C 413753) (A4200A, SM-D-921300)	Aline Replace			0.3 0.2			7,10,21 8,9	F,Y X,Y
030303	Amplifier Audio (Audio and Squelch Preamp Assy) (A4300, SM-B-413785) (A4300A, SM-D-921316)	Aline Replace			0.3 0.2			10,17,21 8,9	F X
030304	Chassis Assembly, Electrical (A1, SM-D-413802)	Test Test Replace Repair Repair			0.2 0.5	0.2 0.5	0.5	13 13 8,9 8,9 132	B H
0304	Amplifier Assy, IF. (Audio and Squelch Amplifier) (A5000, A5000A, SM-D-413820)	Test Test Aline Repair Repair Repair			0.3 0.2 0.5	0.5	0.3 0.5	7,10,21 28,32, 36,37, 45,206 7,10,21 8,9 8,9 28,32, 36,37, 45,132, 206	B F K,Z M

MAINTENANCE ALLOCATION CHART
FOR
RECEIVER, RADIO
R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
401	Amplifier, Audio Freq, Assy (Rcvr Audio Amplifier) (A5100, SM-C-413834) (A5100A, SM-C-921332)	Replace			0.2			8,9	X
402	Amplifier, Limiter (Rcvr Squelch Amplifier) (A5200, SM-C-413849) (A5200A, Amplifier, DC, SM-C-921347)	Aline Replace			0.2 0.2			7,10,21 8,9	F Z
0403	Filter, Band Pass (Squelch Filter) (A5300, SM-B-413860) (A5300A, SM-C-921362)	Test Aline Replace			0.3 0.2 0.2			7,10,21 7,10,21 8,9	 F Z
0404	Chassis Assy, Electrical (A1, SM-D-413879)	Test Replace Repair Repair			0.3 0.2 0.3	 0.5		13 8,9 8,9 8,9	B N M
305	Voltage Regulator Assy (Voltage Regulator and Housing) (A200, SM-D-414906)	Test Test Repair Repair Repair			0.5 0.8	 1.5	 0.8 1.5	7,13,21 47 8,9 8,9 126,132	B O G

MAINTENANCE ALLOCATION CHART FOR RECEIVER, RADIO R-442/VRC AND R-442A/VRC (CONT)

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMAR
			C	O	F	H	D		
030501	Voltage Regulator Assy (A2100, SM-D-414157) (A2100A, SM-D-921166)	Test					0.1	211	
		Replace			0.5			8,9	X
		Repair					0.3	132	
030502	Voltage Regulator Wiring Assembly (Chassis Wiring Assembly) SM-D-414908	Test			0.8			7,13,21	B
		Test					0.3	47	
		Repair				0.5		8,9	G
		Repair					0.8	132	
030503	Housing Assembly SM-D-414912	Repair				0.4		8,9	O
		Repair					0.5	132	
		Replace					1.0	132	
0306	Cover Assembly (Top) SM-D-414957	Replace		0.1				1	
		Repair			0.3			8,9	
0307	Cover Assembly (Bottom) (SM-D-414960) (Same as Group 0306)								

Section XIV TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC

_S OR TEST PMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Multimeter TS-352B/U (Multimeter AN/URM-105, (6625-00-581-2036) and AN/USM-223, (6625-00-999-7465) May Be Used When Provided)	6625-00-553-0142	
3	O	Power Supply PP-2958	6130-00-985-7899	
4	O	Dummy Load DA-553/U (Dummy Load, DA-437/U (5985-00-089-8990) May Be Used)		
5	O	Meter, RF Power AN/URM-182, or AN/URM-182A	6625-00-148-9371	
6	O	Test Set, Radio AN/PRM-34 (Test Set AN/PRM-34C and Later Models May Be Used in Place of Ref. Item 5 AN/URM-182, A)	6625-01-094-5646	
7	F,H	Power Supply PP-4763A/GRC (Power Supply PP-1104/G (6130-00-542-6385) or Equal May be Used)	5820-00-113-9768	
8	F,H	Tool Kit, Electronic Equipment TK-100/G (Tool Kit, Electronic Repairman (5180-00-532-9112) May Be Used)	5180-00-605-0079	
9	F,H	Tool Kit, Electronic Equipment TK-105/G	5180-00-610-8177	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBE
10	F,H	Test Set Communications, Portable AN/GRM-114. (When Provided Will Replace Items 11 thru 20)	6625-01-108-6206	
11	F,H	Multimeter ME-26B/U (Multimeter ME-303/U (6625-00-969-4105) May Be Used)	6625-00-646-9408	
12	F,H	Test Set, Telephone AN/USM-181 (H-P 3550B) (Voltmeter, ME-30F/U (6625-00-420-9354) Avoid Oscillator, AN/URM-127 (6625-00-783-5965) May Be Used in Combination)	6625-00-740-0344	
13	F,H	Multimeter AN/USM-486 (Multimeter AN/USM-223 (6625-00-999-7465) May Be Used For All Purposes Except Test or Semi-conductors Devices by Measurement of Forward and Reverse Junction Resistance)		
14	F,H	Electronic Counter, Digital Readout AN/USM-459, (H-P 5328A) (Electronic Counter AN/USM-207A (6625-00-044-3228) or Frequency Counter H-P MDL 5245L (6625-00-973-4837) May Be Used)	6625-01-061-8928	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

OLS OR TEST UIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
15	F,H	Generator, Signal AN/URM-103 (Generator, Signal, SG-1144 (6625-01-075-8478), Generator, Signal, AN/URM-48 (6625-00-553-1178), May Be Used. Frequency Accuracy Considerations Will Require Use of an External Frequency Counter.)	6625-00-868-8352	
16	F,H	Distortion Analyzer AN/URM-184 (Spectrum Analyzer TS-723/U (6625-00-432-7312) May Be Used)	6625-00-802-8718	
17	F,H	Oscilloscope AN/USM-281C	6625-00-106-9622	
18	F,H	Meter, Radio Frequency Power AN/URM-120	6625-00-813-8430	
19	F,H	Dummy Load, Electrical DA-75/U (Dummy Load, DA-553 May Be Used)	6625-00-177-1639	
20	F,H	Meter, Modulation ME-57 (80058)	6625-00-432-7312	
21	F,H,D	Maintenance Kit, Electronic Equipment MK-1978/VRC (When Maintenance Kit MK-1978/VRC is Not Provided, the Following Minimum Fixtures and Accessories Are Required:) Test Cable No. 1 (6625-00-880-6149) Test Cable No. 2 (6625-00-880-5209) Test Cable No. 3 (6625-00-880-5215)	6625-01-078-5893	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBE
		Test Cable No. 4 (6625-00-880-5216) Test Cable No. 5 (6625-00-880-6079) Test Cable No. 6 (6625-00-880-6081) Test Cable No. 7 (6625-00-880-6095) Test Cable No. 8 (6625-00-880-6097) Test Cable No. 9 (6625-00-880-6152) Test Cable No. 12 20 DB Pad, DA-397, or Equal (6625-00-738-5991) (Substitutes May Be Fabricated) A-1000 Alinement Cover (Fabricate per TM 11-5820-401-34-2) A-6000 Alinement Cover (Fabricate per TM 11-5820-401-34-2) A-8100 Alinement Cover (Fabricate per TM 11-5820-401-34-2) Alinement Tool JFD (73899) P/N 5284, (Preferred) or Alinement Tool Jonard 3767 (5120-00-724-3767) Post Extraction Tool, Viking Ind. (53156) 098-0300-0001 (Preferred) Pin Extraction Tool, Viking Ind (53156) 115-0040-000 (Preferred) or Installation and Removal Tool (96906) (5120-00-230-3770) MS 18278-1; Extender Cable, A-5000 Assy (Test Cable		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
		No. 12) (Fabricate per Instructions in TM 11-5820-401-34-2) Extender Cable, A-6200 Assy (Fabricate per Instructions in TM 11-5820-401-34-2) Cable, RF CG-409/U Antenna AS-1729/VRC NOTE Equivalent commercial equipment not otherwise specified may be used by maintenance activities when such equipment is provided. This does not constitute authority to deviate from the provisions of AR 750-43.		
22	F,H	Hand Set H-189/U (or Equal)	5965-00-069-8886	
23	F,H,D	Attenuator, Variable CN-796/U	5985-00-831-5991	
24	H,D	A-9000 Test Panel (Fabricate per TM 11-5820-401-34-2)		
25	D	Analyzer ZM-3	6625-00-229-1060	
26	D	Audio Oscillator H-P 200AB		
27	D	Deviation Meter, Marconx 2300A	6625-00-480-8706	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBE
28	D	Digital Readout, Electronic Counter AN/USM-207	6625-00-911-6368	
29	D	Electronic Multimeter Fluke 8000A	6625-01-322-8175	
30	D	Control, Frequency Selector C-2742/VPC	5820-00-892-3343	
31	D	Multimeter, Simpson MPL 260	6625-00-985-3951	
32	D	Oscilloscope Textronix MDL 7704A	6625-00-115-2402	
33	D	Power Supply PP-1104/G	6130-00-635-4900	
34	D	Signal Generator AN/GRM-50 (H-P 606A)	6625-00-003-3238	
35	D	Signal Generator H-P 8660B	6625-01-011-2491	
36	D	Signal Generator AN/URM-127	6625-00-783-5965	
37	D	Spectrum Analyzer HP-4333		
38	D	Wattmeter, Thru-Line Bird MDL 43		
39	D	Dummy Load Bird MDL		
40	D	Wattmeter, Bird MDL 61 (2 1/2-2DW)		
41	D	Voltmeter ME-30C/U	6625-00-669-0742	

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
42	D	Voltmeter, Electronic, Boonton 91C (RF Millivoltmeter)	6625-00-973-2294	
43	D	Spectrum Analyzer, Consisting Of: HP 141T Mainframe HP 8552B RF Section HP 8553B IF Section	 6625-00-424-4370 6625-00-431-9339 6625-00-432-5055	
44	D	RF Millivoltmeter, Boonton 92BD		
45	D	Digital Voltmeter, Simpson 464		
46	D	DC Voltmeter AN/USM-98A	6625-00-753-2115	
47	D	AN/GSM-72 Robotester		
48	D	High Impedance (X10) Probe, HP 1124A (or Equal) Required With Item 43, Spectrum Analyzer		
49	D	Video Amplifier, HP461A, is Required With Some Deviation Meters (Item 27). Marconi TF 2300 Series Do Not Require Video Amplifier		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBE
101	D	Adapter UG-274 B/U	5935-00-201-2411	
102	D	Alinement Cover Set, Consisting Of: (Fabricate per DMWR 11-5820-401) A1000 A1200 A3300, A A3600, A A4100, A A4200, A A6000 A8100, A A8200, A		
103	F,H,D	Test Cable No. 1	6625-00-880-6149	
104	F,H,D	Test Cable No. 2	6625-00-880-5209	
105	F,H,D	Test Cable No. 3	6625-00-880-5215	
106	F,H,D	Test Cable No. 4	6625-00-880-5216	
107	F,H,D	Test Cable No. 5	6625-00-880-6079	
108	F,H,D	Test Cable No. 6	6625-00-880-6081	
109	F,H,D	Test Cable No. 7	6625-00-880-6095	
110	F,H,D	Test Cable No. 8	6625-00-880-6097	
111	F,H,D	Test Cable No. 9	6625-00-880-6152	
		Fabricate Following per DMWR 11-5820-401		
112	D	Test Cable No. 11		
113	D	Test Cable No. 12		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
114	D	Test Cable No. 13		
115	D	Test Cable No. 14		
116	D	Test Cable No. 15		
117	D	Test Cable No. 16		
118	D	Test Cable No. 17		
119	D	Cable Assy, RF CG-409/V Series		
120	D	Cable Assy, Special Purpose, Electrical CX-7059/VRC (5 ft)	5995-00-823-2865	
121	D	Adapter UG-201/U	5935-00-259-0205	
122	D	Adapter UG-914	5935-00-250-4680	
123	D	Microphone M-80/GR	5965-00-179-7762	
124	D	Loudspeaker LS-454/U	5965-00-876-2375	
125	D	Attenuator CN-796/U	5985-00-087-2597	
126	D	Pin Extractor Tools (For P 401; P 351, etc): P/N 098-0300-000 (Post Tool); P/N 115-0040-000 (Tip Tool); Viking Industries, Chatsworth CA, 91311		
127	D	Pad, 20 DB, 50-Ohm (Fabricate per DMWR 11-5820-401)		
128	D	A1200 Test Card, Tad #		
129	D	A1400 Test Card, Tad #		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBE
130	D	Torque Wrench: 0-36 Oz In		
131	D	Torque Wrench: 0-75 Oz In		
132	D	Tool Kit, Electronic Repairman	5180-00-532-9112	
		Fixtures		
201	D	Intermediate Gear Train Alinement and Holding Fixture Tad # (Tad: Tobyhanna Army Depot, PA)		
202	D	Heat Exchanger Alinement and Test Fixture Tad # AN/VRC-12-999-Head		
203	D	A1000 (VHF Tuner) Alinement and Test Fixture Tad # AN/VRC-12-012		
204	D	A3000 (CRS Tray) Alinement and Test Fixture Tad # AN/VRC-12-007		
205	D	A4000 (REVR IF Tray) Alinement and Test Fixture Tad # AN/VRC-12-003 A4000A (See DMWR 11-5820-401)		
206	D	A5000 (REVR Avoid AMP) Alinement and Test Fixture Tad # AN/VRC-12-995		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
207	D	A6000 (XMTR Master Osc-Buffer) Alinement and Test Fixture Tad # AN/VRC-12-996		
208	D	A8000 (XMTR Modulator Tray) Alinement and Test Fixture Tad # AN/VRC-12-002		
209	D	VHF Tuner Module Fixtures: A1100 – SM-D-324021, Modified; A1200 – SM-D-324022, Modified; A1300 – SM-D-324023, Modified; A1400 – SM-D-324024, Modified; A1500 – SM-D-323854, Modified; A1600 – AN/VRC –12-882; A1600A (See DMWR 11-5820-401); A2000 (Reference Oscillator)		
210	D	Sundial Fixture A2000A (See DMWR 11-5820-401) Tad # AN/VRC-12-Sundial		
211	D	A2100 (Voltage Regulator Card) Test Fixture Tad # AN/VRC-12-896 A2100A (See DMWR 11-5820-401)		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
212	D	CRS Module Fixtures: A3100 SM-D-323843 A3200 SM-D-323840 A3300 SM-D-323841 A3400 SM-D-323844 A3500 SM-D-323844 A3600 SM-D-323845 A3700 SM-D-323846		
213	D	IF Amplifier Module Fixtures: A4100 Tad # A4200 Tad # A4300 Tad #		
214	D	Audio Amplifier Module Fixtures: A5100 SM-D-323847 A5200 SM-D-323849 A5300 SM-D-323849 A5100A (See DMWR 11-5820-401) A5200A/A5300A (See DMWR 11-5820-401)		
215	D	Master Oscillator-Buffer Amplifier Circuit Card Fixtures: A6300 SM-D-323860 A6400 SM-D-323861		
216	D	Transmitter Modulator Module Fixtures: A8100, SM-D-323845 A8200, SM-D-323851 A8300, SM-D-323850 A8400, SM-D-323853 A8500, SM-D-323852		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO-TRANSMITTERS RT-246/VRC, RT-246A/VRC, RT-524/VRC, RT-524A/VRC, AND RADIO-RECEIVERS R-442/VRC AND R-442A/VRC (CONT)

OOLS OR TEST QUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
217	D	A9000,/9400, A, Load Test Fixture Tad # AN/VRC-12-884A A9000A/A9400B (See DMWR 11-5820-401)		
218	D	A7000 (Autotuning) Fixtures: A7200 - Tad # AN/VRC72-906		
219	D	RT-246 and RT-524 Control Assembly Fixtures (Front Panel): Front Panel Fixture Tad # 514 Microswitch Fixture Tad # Final - Overall Radio Test Fixture - Tad # AN/VRC-12-862		
220	D	R-442(*)/VRC Control Assembly Fixtures: Front Panel Tad #		

Section XV REMARKS

REFERENCE CODE	REMARKS
A	Operational check as part of system.
B	Bench test to determine source of fault.
C	Includes gear trains and wiring.
D	By replacement of modules, relays, and selected individual components.
E	These items appear without maintenance function or categories to provide for clarity and compatibility between this document and the RPSTL.
F	Alinement as part of the receiver-transmitter or receiver. Alinement includes replacement of cores, slugs, and locking strips as required.
G	Repair as part of the receiver-transmitter or receiver by rewiring and/or replacement of hardware and components.
H	By replacement of selected subassemblies.
I	By replacement of connectors, conductors, relay sockets, etc.
J	By replacement of individual wire, cables, switch assembly, and selected components.
K	By replacement of modules, parent board assembly, and parent board assembly pins.
L	By replacement of parent board assembly, parent board pins, and connector.
M	By replacement of elements of chassis assembly and/or connector.
N	By replacement of parent board assembly.
O	By replacement of selected piece parts and assemblies.
P	For continuity and power transistor tests.
Q	By replacement of tube, switch, and attaching hardware.
R	By replacement of external components and bushings.
S	By replacement of attaching hardware and packing.

REMARKS (CONT)

REFERENCE CODE	REMARKS
T	By replacement of relays, external switches, knobs packings, and attaching hardware.
U	By replacement of switch circuit boards, connectors, selected mechanical parts, and wiring.
V	By replacement of chassis, connectors, wiring, and circuit card.
W	When installed; to repair front panel damage.
X	"Plain" and "A" model assemblies are interchangeable.
Y	"Plain" and "A" model assemblies are physically and electrically interchangeable but require differing adjustments.
Z	Interchangeable in pairs: A-5200A and A-5300A, or A-5200 and A-5300.
AA	Interchangeable in pairs: A9000A and A9400B, or A9000 and A9400, A9400A.
AB	Subassemblies are not directly interchangeable between "Plain" and "A" models.
AC	Power transistors must be replaced as pairs.
AD	For replacement of entire cover assembly, use cover provided on RT-246, P/N (80063) SM-D-414288.
AE	For replacement, unit will be assembled from subassemblies of this functional group.

Section XVI MAINTENANCE ALLOCATION CHART FOR ANTENNA AT-912/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARK
			C	O	F	H	D		
00	ANTENNA AT-912/VRC	Inspect	0.10					(See Sect XVII)	
		Install		0.50				1	
		Test		0.20				2 thru 5	
		Overhaul					1.00	6 thru 22	
01	ANTENNA ELEMENTS AT-1095/VRC, AT-1096/VRC	Replace		0.50					
		Repair					0.50		
02	ANTENNA MATCHING UNIT-BASE MX-2799/VRC	Install		0.50				1	
		Replace		0.50				1	
		Overhaul					2.00	6 thru 22	
03	BASE, ANTENNA SUPPORT AB-719/VRC	Install		0.10				1	
		Replace		0.20				1	
		Repair					0.50		

Section XVII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR ANTENNA AT-912/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Test Set, Radio AN/PRM-34	6625-01-094-5646	
3	O	Meter, RF Power AN/URM-182 or URM-182A	6625-00-148-9371	
4	O	Multimeter TS-352B/U	6625-00-553-0142	
5	O	Multimeter AN/URM-105	6625-00-581-2036	
6	D	Multimeter ME-26B/U	6625-00-646-9409	
7	D	Digital Readout, Electronic Counter AN/USM-207	6625-00-911-6368	
8	D	Amplifier, Radio Frequency AM-3495/U	6625-00-985-8891	
9	D	Unit Oscillator: General Radio, Type 1211-B		
10	D	Unit Oscillator: General Radio, Type 1215-B (2 ea)		
11	D	Unit Regulated Power Supply: General Radio, Type 1201-A (2 ea)		
12	D	Unit IF Amplifier: General Radio, Type 1216-A		
13	D	Mixer-Rectifier: General Radio, Type 874-MR		
14	D	UHF Admittance Meter: General Radio, Type 1602-B		

TOOL AND TEST EQUIPMENT REQUIREMENTS FOR ANTENNA AT-912/VRC (CONT)

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
15	D	Generator, Signal AN/USM-44	6625-00-539-9685	
16	D	Radio Interference Measuring Set AN/URM-85	6625-00-776-0595	
17	D	Power Supply PP-1104/G	6130-00-542-6385	
18	D	Receiver-Transmitter, Radio RT-524/VRC	5820-00-892-0622	
19	D	Wattmeter, Bird Model 614		
20	D	Ground Plane, 10 ft X 10 ft Sheet Capper 80 Screen Capper		
21	D	MX-2799/VRC Alinement Cover (Locally Fabricate: DMWR 11-5820-401-5)		
22	D	Adapter General Radio, GR 874-2BPA (2 ea)		
23	D	Termination, 50-Ohms, General Radio GR 1602-P4		
24	D	Switch Assembly (Locally Fabricate: DMWR 11-5820-401-4)		

Section XVIII MAINTENANCE ALLOCATION CHART FOR CONTROL, FREQUENCY SELECTOR C-2742/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	CONTROL, FREQUENCY SELECTOR C-2742/VRC	Inspect	0.10	0.10				(See Sect XIX)	(See Sect XX)
		Install		0.20				1	A
		Test		0.10					
		Test			0.30			3,4	
		Repair		0.1				2	B
		Repair			0.50				
		Overhaul					1.00	3,4	

Section XIX TOOL AND TEST EQUIPMENT REQUIREMENTS FOR CONTROL, FREQUENCY SELECTOR

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	F	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
3	O,F,D	Multimeter TS-352B/U	6625-00-553-0142	
4	F,D	Power Supply PP-1104/U	6130-00-542-6385	

Section XX REMARKS (C-2742/VRC)

REFERENCE CODE	REMARKS
A	Operational test.
B	Repair by replacing knobs, indicator lens, lamp, receptacle covers, mounting hardware, and cover assembly.

Section XXI MAINTENANCE ALLOCATION CHART FOR CONTROL, RADIO SET - C-2299/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
00	CONTROL, RADIO SET C-2299/VRC	Inspect	0.10	0.10				(See Sect XXII)	(See Sect XXIII)
		Install		0.20				1	A
		Repair		0.20					
		Repair			0.50			2	B
		Test		0.10					
		Test			0.50			3	
		Overhaul					1.00	4 thru 7	

Section XXII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR CONTROLS, RADIO SET C-2299/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O,F	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
3	F	Multimeter TS-352B/U	6625-00-553-0142	
4	D	Power Supply PP-1104/U	6130-00-542-6385	
5	D	Analyzer, Spectrum TS-723B/U	6625-00-668-9418	
6	D	Generator, Signal AN/URM-127	6625-00-783-5965	
7	D	Oscilloscope AN/USM-281A	6625-00-228-2201	

Section XXIII REMARKS (C-2299/VRC)

REFERENCE CODE	REMARKS
A	Repair by replacing knobs, receptacle covers, and mounting hardware.
B	Operational tests.

Section XXIV MAINTENANCE ALLOCATION CHART FOR MOUNTING MT-1029/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	MOUNTING MT-1029/VRC							(See Sect XXV)	
		Inspect		0.20					
		Install		0.50				1	
		Test		0.50				2	
		Repair			0.20			1,2	A
		Test			0.50			3	
		Repair			0.50			4	
		Overhaul					1.00	3,4	

Section XXV TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MOUNTING MT-1029/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Multimeter AN/URM-105	6625-00-581-2036	
3	O,F,D	Multimeter TS-352B/U	6625-00-553-0142	
4	F,D	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	

Section XXVI REMARKS (MT-1029/VRC)

REFERENCE CODE	REMARKS
A	Repair by replacing shock mounts and rewiring terminal board.

Section XXVII MAINTENANCE ALLOCATION CHART FOR MOUNTING MT-1898/VRC

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
00	MOUNTING MT-1898/VRC							(See Sect XXVIII)	
		Inspect		0.10				1	
		Install		0.50				2	
		Test		0.50				1,2	A
		Repair							
		Test			0.50			3	
		Repair			0.50			4	
		Overhaul					1.00	3,4	

Section XXVIII TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MOUNTING MT-1898/VRC

TOOLS OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178	
2	O	Multimeter AN/URM-105	6625-00-581-2036	
3	O,F,D	Multimeter TS-352B/U	6625-00-553-0142	
4	F,D	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	

Section XXIX REMARKS (MT-1898/VRC)

REFERENCE CODE	REMARKS
A	Repair by replacing shock mounts and rewiring terminal board.

APPENDIX C

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I INTRODUCTION

C-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/VRC-12 series radios. These items are authorized to you by CTA 50-970, Expendable items (except medical, class V, repair parts, and heraldic items).

C-2. EXPLANATION OF COLUMNS.

a. Column 1, Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., use cleaning compound, item 1, appendix E).

b. Column 2, Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational

c. Column 3, National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the item.

d. Column 4, Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5, Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character abbreviation (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION (FSCM)	(5) U/M
1	C	6850-00-880-7616	Silicone Compound	tube (8 oz)
2	C	5905-00-293-4208	Wire, Nonelectrical (Safety Wire)	lb
3	O	5970-00-816-6056	Insulation Tape, Electrical, Plastic	ft
4	O	7510-00-290-8036	Pressure Sensitive Tape, Filament Reinforced	yd (60)
5	C	6850-00-105-3084	Cleaning Compound, Freon TF (Trichlorotrifluoroethane)	oz (16)
6	O	6850-00-984-5853	Cleaning Compound, Freon PCA (Trichlorotrifluoroethane)	gal.
7	C	5330-00-905-6032	O-Ring 80063	(5) ea

GLOSSARY

Section I ABBREVIATIONS

ant	antenna
ant cont	antenna connection
aux	auxiliary
chan sel	channel select
ckt-brk	circuit breaker
dc	direct current
fm	frequency modulated
hi	high
HZ	hertz
int	intercom
kc	kilocycles
kHz	kilohertz
lo	low
mc	megacycles
MHz	megahertz
pwr	power
rad trans	radio transmission
retrans	retransmission
rf	radio frequency
RT	radio transmitter
rw	radio wire
rwi	radio wire integration
spkr	speaker
sw	switch
vdc	voltage direct current
VRC	vehicle radio communications

Section II DEFINITION OF UNUSUAL TERMS

CONFIGURATION. A combination of AN/VRC-12 Radio Set components installed in a specific vehicle.

CONTROLLED AUDIO. A received audio signal that is not amplified by the Interphone Amplifier A-250 of the AM-1780/VRC.

CONTROL BOX. A component located remotely from the RT which can be used to control communication and may provide a connection for audio accessories.

DEMODULATION. The process in a receiver of removing a carrier frequency from the audio signal so that the audio signal remains.

DUPLEX. Mode of radio operation in which both reception and transmission can be performed at the same time.

FIXED AUDIO. A received audio signal which is amplified by the Interphone Amplifier A250 of the AM-1780/VRC.

FORWARD POWER. The strength of an rf signal from a transmitter radiated by its antenna.

DEFINITION OF UNUSUAL TERMS (CONT)

FREQUENCY MODULATION. A type of radio transmission in which the frequency of an rf carrier wave is varied in accordance with a modulating signal while the amplitude of the carrier wave remains constant.

IMPEDANCE. The opposition of a circuit to the flow of alternating current, measured in ohms.

MATCHING UNIT. A component of an RT antenna system which electrically matches the impedance of the antenna to the frequency at which the RT is tuned so that the antenna may radiate the rf signal with the greatest efficiency. May also be used to physically mount the antenna elements.

MODULATION. The process of varying some characteristic, such as the frequency, of a continuous wave (carrier) in accordance with a modulating signal such as an audio signal.

MUTING. Reduction of speaker output (loudness) to prevent acoustic feedback to an audio accessory microphone.

OPERATIONAL CHECK. A test or series of tests of a radio set which checks the performance of the radio set and its components under controlled operating conditions to determine combat readiness of the radio set.

ORIENTATION. Positioning of connected cables so that they do not interfere with other cables or crewmember activity.

RADIO SET. Any configuration of components installed in a vehicle which provide communication to a station distant from the vehicle.

REFLECTED POWER. The strength of an incoming rf signal passed by a receiver antenna to the receiver.

REMOTE CONTROL. The operation of the radio set by remotely located components.

RETRANSMISSION. The arrangement of two radio sets connected together to provide automatic retransmission of signals between two radios that are too far apart to communicate directly with each other.

ROUTING. Path taken by cables to interconnect a radio set within a vehicle.

SIDETONE. The sound of user's own voice heard in earphone or loudspeaker while speaking into microphone.

SIMPLEX. Mode of radio set operation in which either transmission or reception only is performed at any one time.

SQUELCH. A receiver circuit which automatically turns the sound off when no antenna signal is present and turns it on when an antenna signal is present.

X-MODE. A mode of operation which provides for secure communication between stations.

*. Symbol used when basic model number refers to all models of the equipment.

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Your Mailing Address

DATE SENT
Date You Filled Out This Form

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5820-401-20-1/ NAVY EE150-JA-MMO-010/E154 VRC 12,43		RADIO SETS: AN/VRC-12 (NSN 5820-00-223-7412)

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE
SSG I. M. DeSpiritof 999-1776	SSG I. M. DeSpiritof

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To be distributed in accordance with DA Form 12-51 requirements for AN/VRC-12, AN/VRC-43 thru 49.

* U.S. GOVERNMENT PRINTING OFFICE: 1984-706-490

Notes: RT Unit.
1. Reference designations in parenthesis ( ) denotes RT-246 only.
2. X-MODE plug must be in place when speech security equipment is NOT used.
3. X-MODE switch (bottom of A4000) is set to, and left in X-MODE.

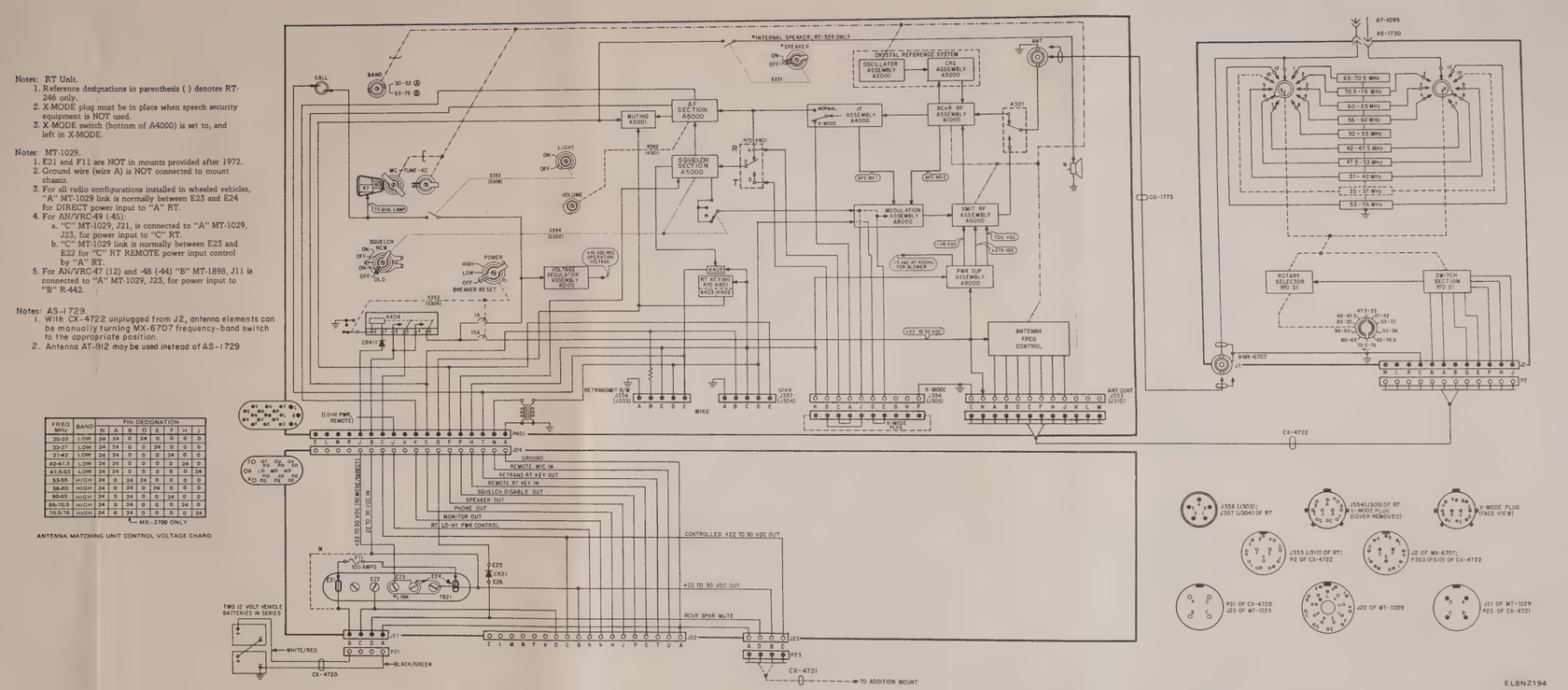
Notes: MT-1029.
1. E21 and F11 are NOT in mounts provided after 1972.
2. Ground wire (wire A) is NOT connected to mount chassis.
3. For all radio configurations installed in wheeled vehicles, "A" MT-1029 link is normally between E23 and E24 for DIRECT power input to "A" RT.
4. For AN/VRC-49 (-45):
   a. "C" MT-1029, J21, is connected to "A" MT-1029, J23, for power input to "C" RT.
   b. "C" MT-1029 link is normally between E23 and E22 for "C" RT REMOTE power input control by "A" RT.
5. For AN/VRC-47 (12) and -48 (-44) "B" MT-1898, J11 is connected to "A" MT-1029, J23, for power input to "B" R-442.

Notes: AS-1729
1. With CX-4722 unplugged from J2, antenna elements can be manually turning MX-6707 frequency-band switch to the appropriate position.
2. Antenna AT-912 may be used instead of AS-1729

FREQ MHz	BAND	PIN DESIGNATION							
		N	A	B	D	E	F	H	J
30-33	LOW	24	24	0	24	0	0	0	0
33-37	LOW	24	24	0	0	24	0	0	0
37-42	LOW	24	24	0	0	0	24	0	0
42-47.5	LOW	24	24	0	0	0	0	24	0
47.5-53	LOW	24	24	0	0	0	0	0	24
53-56	HIGH	24	0	24	24	0	0	0	0
56-60	HIGH	24	0	24	0	24	0	0	0
60-65	HIGH	24	0	24	0	0	24	0	0
65-70.5	HIGH	24	0	24	0	0	0	24	0
70.5-76	HIGH	24	0	24	0	0	0	0	24

MX-2799 ONLY

ANTENNA MATCHING UNIT CONTROL VOLTAGE CHARD

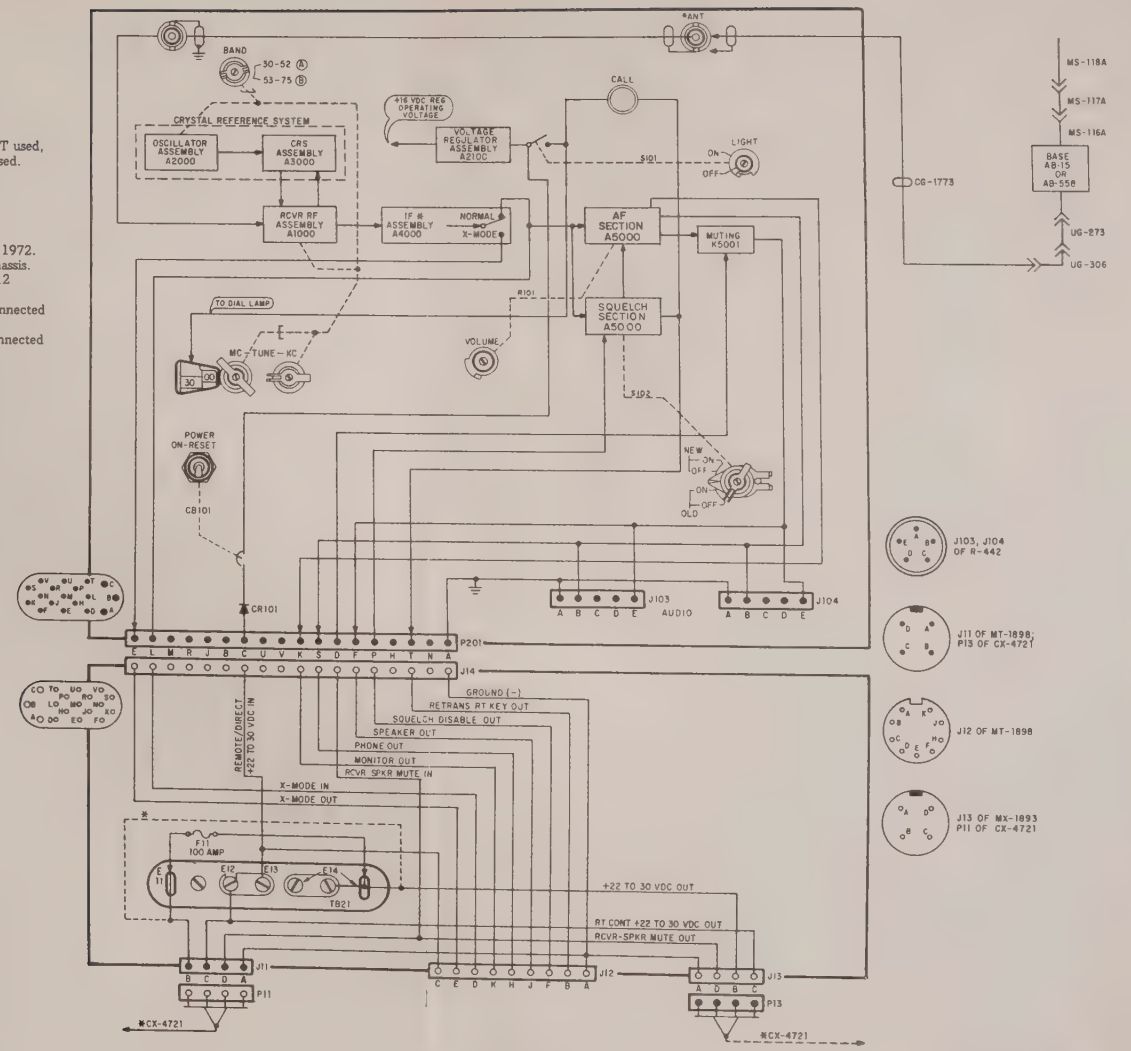


ELSNZ194

FO-1. AN/VRC-46 (-43) Radio Set Diagram (Nonsecure)

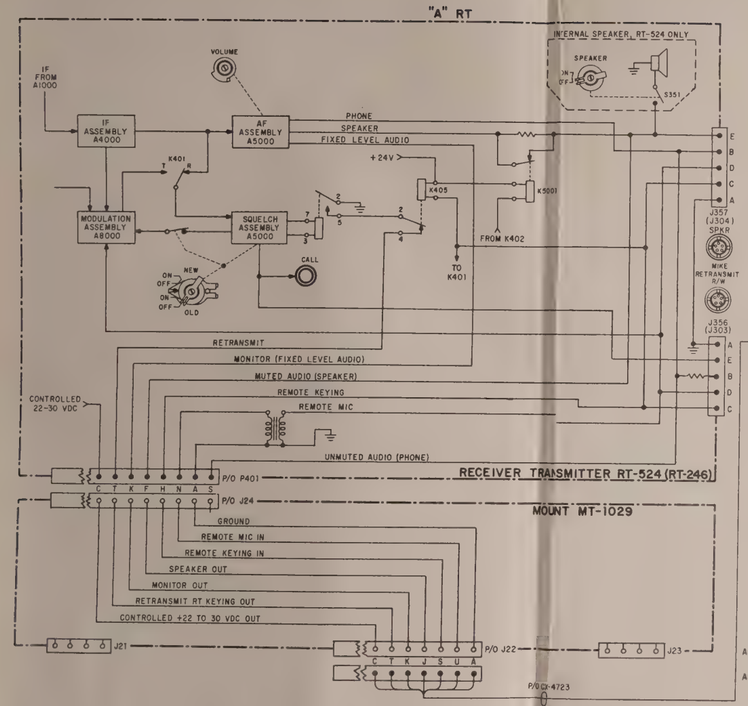
Notes: R-442.
1. X-MODE switch (bottom of A4000) must be in NORMAL, when speech secure equipment is NOT used, or X-MODE, when speech secure equipment is used.
2. For AN/VRC-48 (-44), "C" R-442 ANT jack is connected to one of "B" R-442 ANT jacks by a CG-1127 cable.

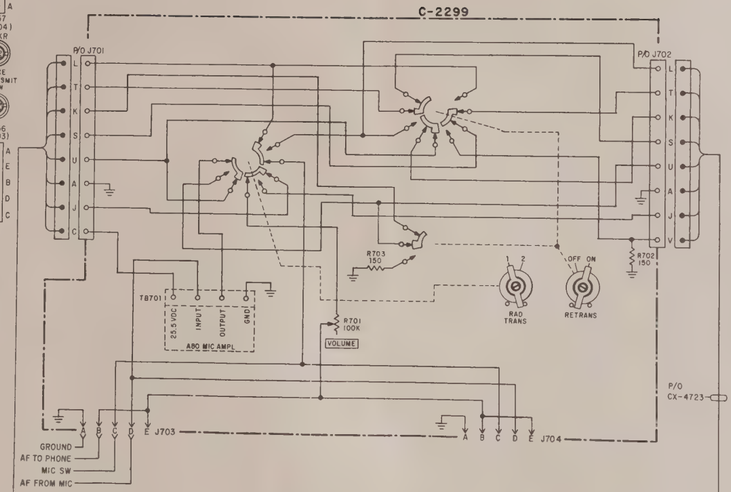
Notes: MT-1898.
1. E11 and F11 are NOT in mounts provided after 1972.
2. Ground (wire A) is NOT connected to mount chassis.
3. For all configurations link is normally between E12 and E13 for controlled power (remote).
4. For AN/VRC -47 (-12) "B" MT-1898, J11, is connected to "A" MT-1029, J23, by CX-4721 cable.
5. For AN/VRC-48 (-44), "C" MT-1898, J11, is connected to "B" MT-1898, J13, by a CX-4721 cable.

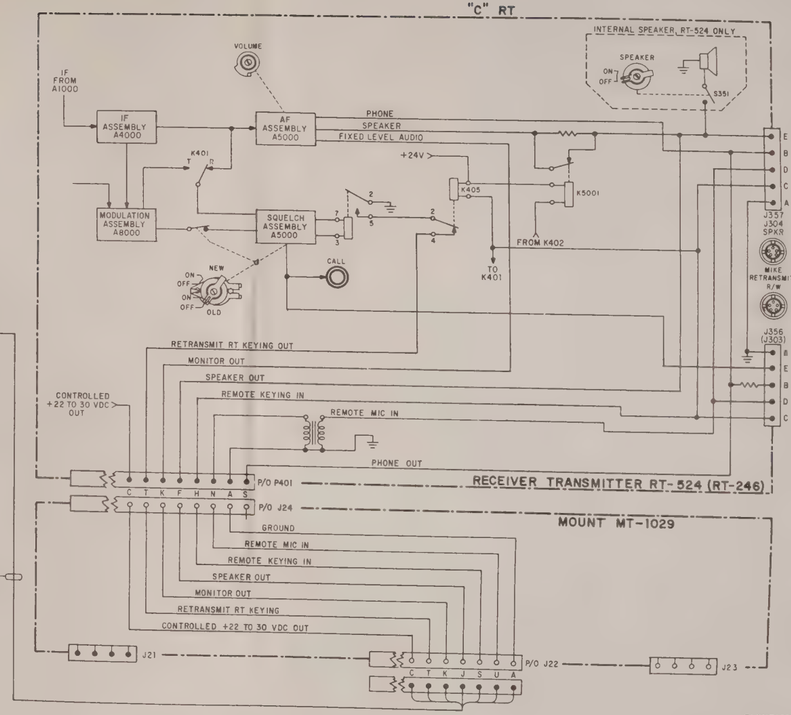


EL8NZ193

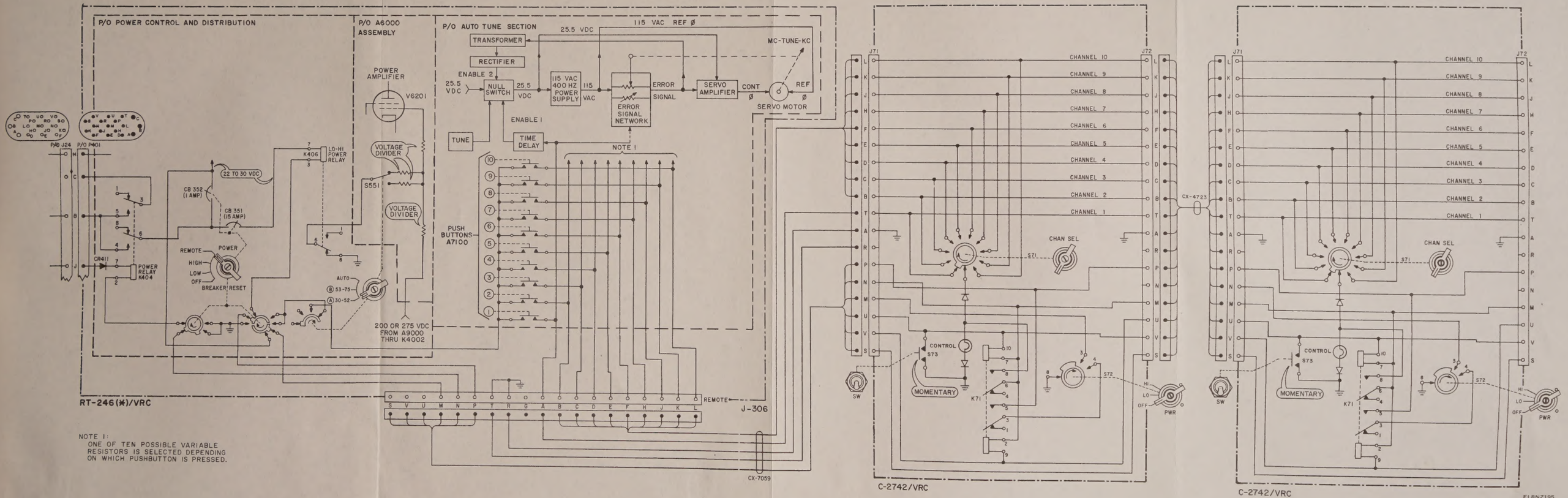
FO-2. R-442 with MT-1898


"A" RT
INTERNAL SPEAKER, RT-524 ONLY
SPEAKER
ON OFF
S351
VOLUME
IF FROM A1000
IF ASSEMBLY A4000
AF ASSEMBLY A5000
PHONE
SPEAKER
FIXED LEVEL AUDIO
+24V
K401
K405
K5001
MODULATION ASSEMBLY A8000
SQUELCH ASSEMBLY A5000
FROM K402
TO K401
CALL
NEW
OLD
ON OFF
J357 (J304) SPKR
MIKE RETRANSMIT R/W
J356 (J303)
RETRANSMIT
MONITOR (FIXED LEVEL AUDIO)
MUTED AUDIO (SPEAKER)
REMOTE KEYING
REMOTE MIC
UNMUTED AUDIO (PHONE)
CONTROLLED 22-30 VDC
P/O P401
P/O J24
RECEIVER TRANSMITTER RT-524 (RT-246)
MOUNT MT-1029
GROUND
REMOTE MIC IN
REMOTE KEYING IN
SPEAKER OUT
MONITOR OUT
RETRANSMIT RT KEYING OUT
CONTROLLED +22 TO 30 VDC OUT
J21
P/O J22
J23
P/O CX-4723


C-2299
P/O J701
P/O J702
T8701
25.5 VDC
INPUT
OUTPUT
GND
A80 MIC AMPL
R701 100K
VOLUME
R703 150
R702 150
RAD TRANS
RETRANS
OFF ON
P/O CX-4723
J703
J704
GROUND
AF TO PHONE
MIC SW
AF FROM MIC


"C" RT
INTERNAL SPEAKER, RT-524 ONLY
SPEAKER
ON OFF
S351
VOLUME
IF FROM A1000
IF ASSEMBLY A4000
AF ASSEMBLY A5000
PHONE
SPEAKER
FIXED LEVEL AUDIO
+24V
K401
K405
K5001
MODULATION ASSEMBLY A8000
SQUELCH ASSEMBLY A5000
FROM K402
TO K401
CALL
NEW
OLD
ON OFF
J357 J304 SPKR
MIKE RETRANSMIT R/W
J356 (J303)
RETRANSMIT RT KEYING OUT
MONITOR OUT
SPEAKER OUT
REMOTE KEYING IN
REMOTE MIC IN
PHONE OUT
CONTROLLED +22 TO 30 VDC OUT
P/O P401
P/O J24
RECEIVER TRANSMITTER RT-524 (RT-246)
MOUNT MT-1029
GROUND
REMOTE MIC IN
REMOTE KEYING IN
SPEAKER OUT
MONITOR OUT
RETRANSMIT RT KEYING
CONTROLLED +22 TO 30 VDC OUT
J21
P/O J22
J23

EL8NZ192



NOTE 1:
ONE OF TEN POSSIBLE VARIABLE RESISTORS IS SELECTED DEPENDING ON WHICH PUSHBUTTON IS PRESSED.

FO-4. RT-246 and C-2742 Remote Power Control and Preset Channel Selection